

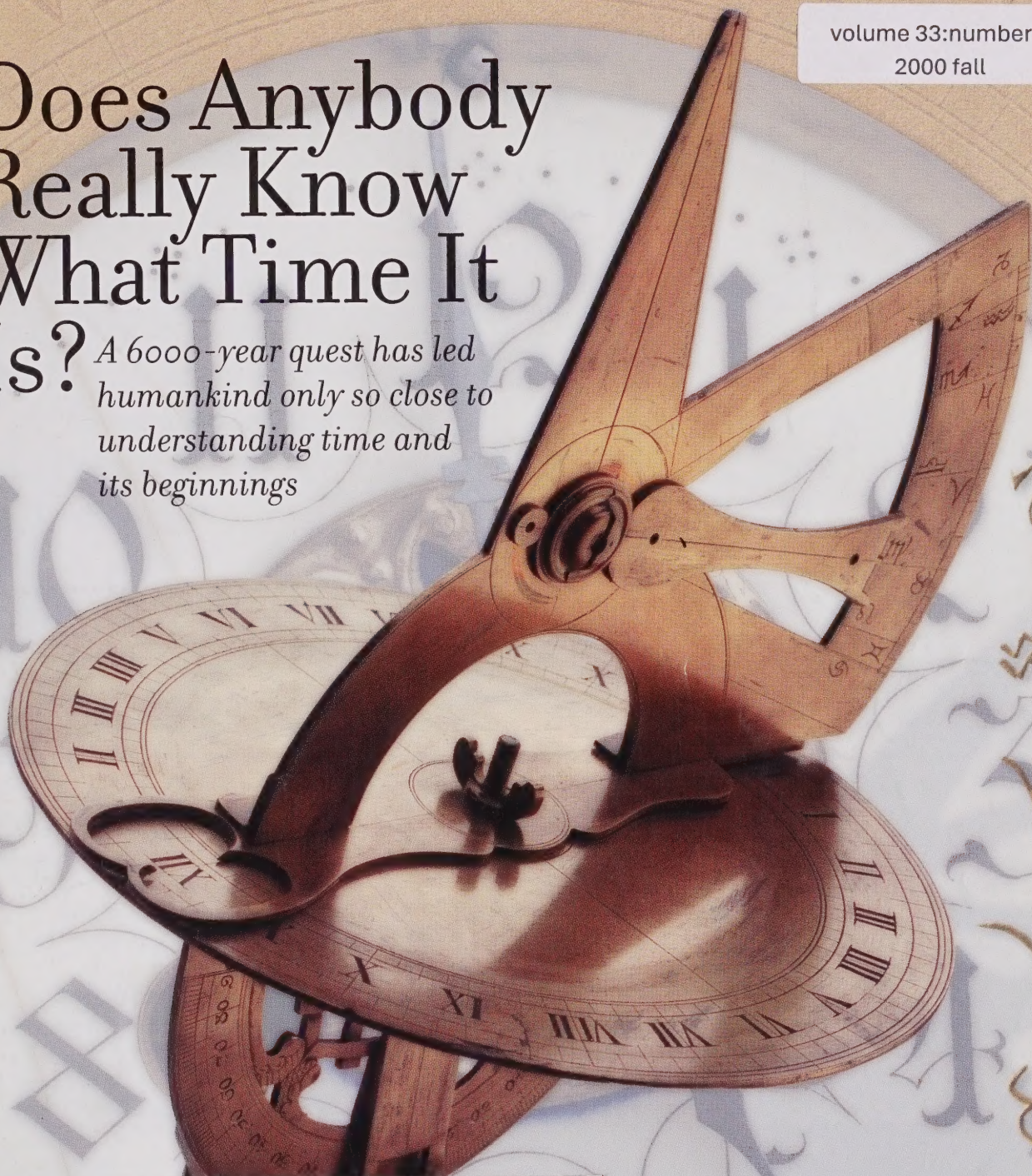
ROTUNDA

THE MAGAZINE OF THE ROYAL ONTARIO MUSEUM

volume 33: number 1
2000 fall

Does Anybody Really Know What Time It

Is? *A 6000-year quest has led
humankind only so close to
understanding time and
its beginnings*



FALL 2000

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David Milne, R.C.A.

Hotel and Butcher Shop, 1931

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C O N T E N T S

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Humans have long struggled to fathom time's beginnings and to measure its passage. Despite enormous strides, time still eludes us.

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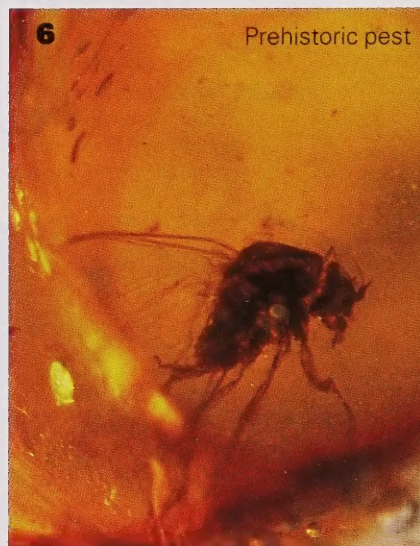
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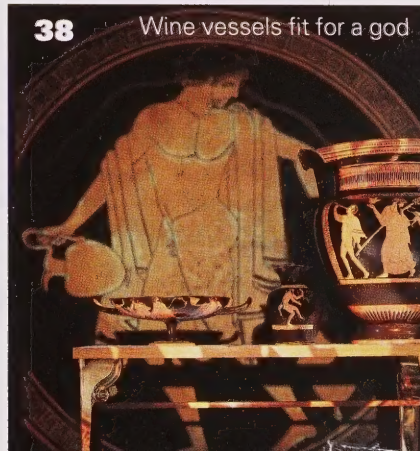
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WILLIAM THORSELL

THE FIRST QUESTION posed by the ROM's presidential search committee was, "Why would a newspaper editor be interested in the directorship of a major museum? Where is the connection?" In fact, newspapers and museums have much in common. Every day, reporters from newspapers such as *The Globe and Mail* go out into the field to discover new information and bring it back to editors who refine and prepare it for effective display to the public. The intent in both cases, broadly speaking, is education based on original research.

Newspapers start over every day in this frenetic process, discarding what they produced yesterday in the service of wrapping fish and filling recycling boxes. A great museum moves much more deliberately and profoundly to achieve its ends.

The ROM has every reason to be recognized among the great museums of the world. It has the unusually rich mandate of exploring, collecting, and communicating the stories of both the planet and of humankind—nature and civilization. It has deep historical and intellectual roots, expressed by very strong collections and a record of substantial scholarship linked to one of the continent's finest universities. It maintains an active program of research and discovery around the world. And it holds pride of place in one of the finest buildings on the best corner in Canada's leading city.

Everything about this supports the ROM's ability—and, indeed, responsibility—to operate at first rank among international cultural institutions. But more: The ROM is surrounded and assisted by one of the world's most highly educated and open-minded populations, people with a well-developed sense of curiosity and concern for their human and natural environment. The ROM need not worry about underestimating the intelligence of the population, as P. T. Barnum so famously

warned his fellow Americans. The ROM is among the fortunate institutions that need to worry about adequately satisfying the high expectations of a particularly sophisticated clientele.

All of this speaks to the agenda before us over the next decade. Our plan is to visibly deepen our research capacities and communicate the results much more effectively to an interested public. It is to substantially refresh and enrich the Museum itself, including the buildings and the great stories that unfold within it. It is to vigorously exploit the remarkable advantages of the ROM's mandate and place in Ontario and Canada, ensuring that this institution becomes a lively and essential part of lives lived well in our time.

This requires clarity in our identity and sense of mission, focus in our allocation of resources, and creativity and imagination in pursuing our goals. It means change, to be sure, but change in the service of higher standards and more effective communication of significant facts and phenomena. To realize this, we will need to be as honestly curious and open-minded as the people who rely on the ROM to deepen their knowledge and understanding of the world.

To realize the full potential of the ROM, we will need a great deal of help from our Members, volunteers, friends, and major stakeholders in the public and private sectors. We will seek it on the basis of a compelling, disciplined vision and evidence of a highly-functional organization that prudently manages its resources in an environment of respect, undoubted ethical standards, and good will.

Rarely does a community and its friends have the opportunity that this one does to take a wonderful historical legacy so visibly forward. It is an opportunity that not even a national newspaper editor could resist, and I am privileged to embrace the task together with all of you.

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EDITOR'S NOTE

LEE-ANNE JACK

WHETHER USING the latest electronic gadgets or just a pen on old-fashioned paper, a glance at a calendar, or a synchronization of watches, it seems that people are ever questing to pin down time. It's something we've been doing throughout history. Freelance writer Mark Sabourin spoke with ROM curators from many disciplines for our cover story, in which he chronicles humankind's efforts throughout the ages—and in various cultures—at timekeeping and at calculating time's elusive first moment. We've come a long way since Egyptians built the first shadow clocks in the 15th century BC, but it's somehow surprising that a phenomenon so much a part of our daily lives still manages to keep the brightest of minds guessing.

On another timely topic, a herd of fibreglass moose may seem like the most noticeable wildlife in Toronto right now, but it wasn't long ago, geologically speaking, that the real thing roamed our streets. Torontonians have always shared their green spaces, and sometimes even attics or basements, with wild creatures. ROM mammalogists Mark Engstrom and Judith Eger scoured the available faunal and fossil records to find out which of our wild neighbours kept us company in the past and how those patterns compare to today's.

Perhaps one of the most engaging stories from 19th-century Ontario is that of the Mohawk doctor and insurance man Dr. Oronhyatekha. Keith Jamieson, curator of the Woodland Cultural Centre Museum (WCC) in Brantford, Ontario, documents the life story of this extraordinary man who rose above the prejudices of the day to become one of the first Ontarians of Native ancestry to obtain an MD. He was also a major innovator in the insurance industry. After each phone call with Keith—during which he'd recount anecdotes of Oronhyatekha's association with masons, his

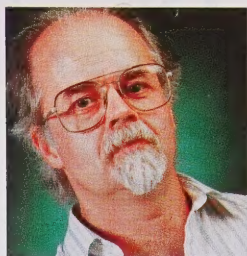
fortuitous encounter with a phrenologist, or the bankruptcy of the company hired to demolish the IOF headquarters (because Oronhyatekha commissioned his workplace to be so mightily built)—I would become more astonished by this larger-than-life historical figure. And the article would grow. One of the wonderful things about a partnership like the one that exists between the ROM and the WCC, who together are co-producing an exhibition about Oronhyatekha, is the many different perspectives that are brought to the telling of a story. Keith and Tom Hill of the WCC have added tremendously to knowledge of the doctor through their face-to-face meetings at Six Nations and Tyendinaga, the two reservations Oronhyatekha was most closely associated with.

Paul Denis, assistant curator in the Department of Western Art and Culture, takes us further back in time with his light-hearted look at Dionysos, the Greek god of wine and revelry. The scenes depicted on the richly decorated artifacts of ancient Greece tell us not only about the god and his followers but also about historical drinking customs. While contributions to philosophy, democracy, even athletics, may first spring to mind when we think of the ancient Greeks, they certainly knew how to enjoy a good party and savour a fine vintage.

Though fall is nearly upon us, I hope you'll have one last opportunity to savour a glass of your own out on the patio, and dip into the histories that unfold in the pages of this issue.

When you've finished reading let us know what you think. We welcome letters from our readers and in this issue have set aside a page for you to have your say.

Here at the ROM, we're looking forward with much anticipation to the new season as we welcome new president and CEO, William Thorsell of *The Globe and Mail*. Don't miss his inaugural message on page 3.



Mark Sabourin

Freelance Writer

Mr. Sabourin (*The Puzzle of Time*) is a freelance writer who recently fled Toronto for a waterfront retreat near Campbellford, Ontario, where, on a summer morning, with the sun still low and the wind calm, time can seem to stand still.



Judith Eger

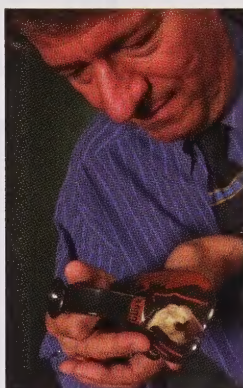
Centre for Biodiversity
and Conservation Biology

Dr. Eger (*Wild in the City*) is a senior curator of mammalogy and was responsible for the popular Bat Cave display at the ROM. Currently her research focuses on the bats of Vietnam, where she has conducted four field trips since 1997.

Mark Engstrom

Centre for Biodiversity
and Conservation Biology

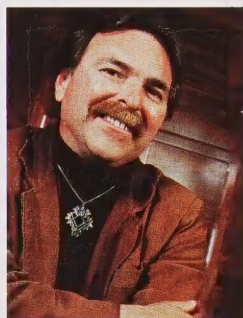
Dr. Engstrom (*Wild in the City*) is director of research at the ROM and a senior curator of mammalogy. His research focuses on the evolutionary biology and systematics of mammals, especially rodents and bats. Fieldwork has taken him from the high Arctic tundra to the heart of the Amazon rainforest.



Paul Denis

Department of Western
Art and Culture

Mr. Denis (*A Toast to Greece's Original Vintner*) is assistant curator responsible for the ROM's Greek, Roman, and Byzantine collections. He is currently working on the exhibition *Dionysos to Bacchus: Wine and Revelry*.



Keith A. Jamieson

Woodland Cultural
Centre Museum

Mr. Jamieson (*Oronhyatekha*) is a Mohawk of the Six Nations Reserve near Brantford, Ontario, where he resides with his wife and two children and is curator of the Woodland Cultural Centre Museum. He is involved in local research and development in the fields of history and education, and has participated in socio-economics projects in First Nations communities across Canada. He is currently curating the exhibition *Mohawk Ideals, Victorian Values: Oronhyatekha, M.D.*

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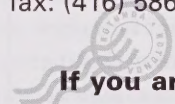
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E X P L O R A

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BRIAN BOYLE, ROM

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Prehistory on the Fly

The earliest known bird parasite

ALTHOUGH this black fly lived during the height of the dinosaur era, it doesn't look much different from one you might see today. Just by glancing at its character states, visible through the 93-million-year-old amber in which it has been preserved, ROM entomologist Doug Currie easily pegs it as a member of an existing lineage. Careful examination of its tarsal claws—its feet—reveal an extra accessory claw, indicating that the fly likely fed on the blood of birds. In fact, a feather was captured in the same amber deposits. Although the earliest birds predated this specimen by some 60 million years, this is certainly the earliest example of an avian blood parasite ever discovered.



Arni Brownstone

BRIAN BOYLE, ROM HD 5621

A Whip is Just a Whip...

Except when summoning demons to a feast

FOR MANY YEARS the object above sat uncomfortably in storage, an anomaly in the tray of northern Plains Indian horse whips. Typically, whips, or quirts, from the plains feature an elkhorn or wooden handle, a short, double lash made of harness leather, and a wrist strap. But the handle of this object is fashioned from a human thighbone. The knee end is partly encased in leather of a kind not used by Plains Indians, and the braided lash is too long for horse riding. Perhaps most puzzling is the absence of a wrist strap. Plains Indians spent much of their time on horseback, and while the whip was essential at times to

spur on their mounts, they often needed the whip-hand free for hunting buffalo, caring for babies, or handling baggage on the trail.

Despite its aberrant qualities, the item remained with the whips, partly because documentation suggested that it had been collected from the Blackfoot tribe, and partly because there was no alternative explanation of its origins. None, that is, until I happened to view an exhibition on Tibetan culture at the Field Museum of Natural History in Chicago. There in a showcase devoted to musical instruments were some half dozen "thighbone trumpets" identical to the handle of the doubtful whip. There remained

only one problem: the lash. Neither the Tibetan trumpets in the ROM's own Far Eastern collection nor those in the Field Museum have lashes. In researching the item for the ROM Foundation's annual *Fact? or Fiction?* quiz, curator Alison Easson came across the answer. She discovered an illustration of a thighbone trumpet with a lash attached.

After confounding curators for years, the artifact was at last confirmed to be a "koongling." It was used to summon demons to a feast in the ritual dance and liturgical recitation called "chod," a traditional part of the religious training for Tibetan lamas.

Arni Brownstone

T I O N S

ART AND DESIGN | PEOPLES OF CANADA



BRIAN BOYLE, ROM, 917.4.55

Drum or Drainpipe?

Rain god impersonators provide a clue

THE FIGURES dancing across the open-ended ceramic cylinder illustrated above mark it as the handiwork of the ancient Zapotec culture of southern Mexico. Decorated in relief and originally covered with pigments, the cylinder was probably produced sometime between 500 and 800 AD. According to its collector, Constantine Rickards, it was unearthed with an identical companion in 1899, near Cuilapan, Oaxaca. He purchased the matching set, but in 1919 sold one of the pieces to the ROM. The location of the other is now unknown. The cylinder's function, too, remains a mystery. Rickards maintained that it was a drainpipe, but the idea of a decorated drainpipe is not very convincing. Some ar-

chaeologists have speculated that the item could be a drum. A close examination revealed that it had been used only at one end. However, the irregularity of the cylinder's mouth and the lack of grooves for tying on a drum skin belie the hypothesis. The key to determining its function may lie in the two carved figures that adorn the piece. Dancing and holding corn plants, they likely represent rain god impersonators. The imagery is common among Mesoamerican cultures and is strongly associated with rituals surrounding agricultural cycles. It's possible that the cylinders were used as stands, perhaps for incense burners, during harvest ceremonies. The jury, however, is still out on this analysis.

Adam Sellen



Peter Fenton



DAVE RUDKIN, ROM

Bear This in Mind

The simple necessities of life sciences research

PALAEONTOLOGISTS ARE notorious for being oblivious to everything except that which lies directly underfoot . . . after all, the only sure way to find fossils is to keep your eyes to the ground. While such heads-down behaviour inevitably leads to a variety of minor mishaps (walking into low tree branches or failing to notice the rising tide are common occurrences), it is seldom a life-threatening preoccupation. However, in some field situations, failing to look up occasionally could be truly perilous. Peter Fenton and Dave Rudkin of the ROM's Department of Palaeobiology spent two weeks last summer on Akimiski Island in James Bay, dividing their time between staring down at the abundantly fossiliferous rocks and furtively glancing over their shoulders. The object of their work was collecting the beautifully preserved Silurian (430 million-year-old) trilobite fossils that are nestled within the ancient tropical reefs of the area. But the two palaeontologists were sharing their section of the subarctic coastline with a dozen or so summering polar bears. Working from a small fenced compound, along with a pair of biologists from the University of Western Ontario and a Ministry of Natural Resources helicopter pilot, Fenton and Rudkin rapidly got used to the concept of toting a loaded shotgun everywhere (especially to the rather exposed privy!) and frequently checking the neighbourhood for large white visitors. Claiming to be undaunted by the presence of maritime carnivores, they plan to return to Akimiski this month to continue the search.

Dave Rudkin

WRITE TO: ROTUNDA, 100 QUEEN'S PARK, TORONTO, ONTARIO, M5S 2C6.
THE EDITORS RESERVE THE RIGHT TO EDIT FOR LENGTH AND CLARITY

Who Were the Ancient Scythians?

BEING VERY INTERESTED IN history, I purchased your magazine. Reading the article "Gold of the Nomads" (Spring 2000), I found I disagreed with a few of the stated facts about the ancient Scythians.

Herodotus set out on a journey to prove or disprove his predecessors' account of the peoples encountered [in the Black Sea region.] He found they were quite correct in saying that the people all spoke the same language—Scythian. Herodotus gives us some words in the Scythian language. These certainly are not Indo-European [as was suggested in the article] or Semetic. They have been recently stated as being perhaps Ural-Altatic, and even related to Sumerian.

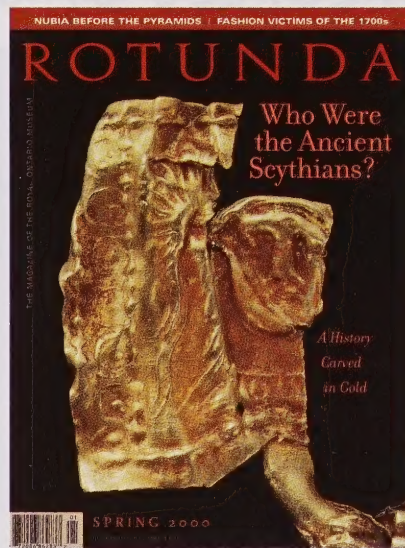
As for the fibula with the face of Alexander, I think not. In every depiction of Alexander I have ever seen, he is depicted as youthful and beardless. The face is perhaps of Philip or a Scythian chieftan.

I will be looking for your magazine in the future.

ALF MINACS
OSHAWA, ONTARIO

Krzysztof Ciuk replies: You have touched on a most difficult topic, which has long puzzled historians. The knowledge of Scythians, their language (or languages), and the beginnings of their Central Asian history is based mainly on indirect sources provided by the Scythians' contemporaries.

Equally as important as the description by Herodotus is information from Persepolis, the monumental necropolis of the Persian kings of kings (shahan shah), which highlights a wealth of Scythian iconography. The Scythians are depicted, along with many other nations, as the throne bearers of the Persian king Darius I. Inscriptions refer to them by their Persian (Farsi) name—Saka.



References are made to *Saka paradraya*—Scythians beyond the (Caspian) Sea; *Saka haumavarga*—the hauma-imbibing Scythians (there is no exact explanation of the term *hauma*, presumably a narcotic plant); and *Saka tigraxauda*—pointed hat Scythians.

Sometime about 3000 BC a large group of people known as Indo-Europeans, or Aryans, who dwelt in what is now South Russia began to disperse, reaching as far as India in the East and Ireland in the West. The major migration wave, occurring around 1000 BC, brought a vast number of Indo-Europeans into Central and Southwest Asia. They called themselves *Arya*, meaning noble, presumably to emphasize the difference between themselves and the indigenous peoples.

Among these Aryan tribes were the people who built the Persian Empire. Going from west to east one encountered the Medes, the Persians, the Zarangians, the Arians (modern Herat in Iran), the Bactrians, the Soghdians, and then, deep in Central Asia, the Scythians. All of them were aware of their close affinities, and they spoke various dialects of a mother tongue known as *Aryan*, ergo Indo-European.

It should be stressed that the generic ethnonym "Scythian" may relate to one or many of the numerous

nomadic tribes roaming the vast lands between Altai and Ukraine. For example, a Byzantine historian Priscus of Panium described his contemporary Huns in 476 AD as "Scythians." As a great many nomadic tribes were united under Attila, it was a very convenient term to apply to his subjects.

While Priscus was correct, all Scythians were not Huns! Later on, historians came to use the term "Huns" the same way in which the term "Scythian" was used by Priscus; its long usage became familiar to every reader and the name "Hun" could be (and has been) employed instead of lesser known names such as Turkic, Khazar, or Petcheneg.

As to the fibula, attributes are very important components in the identification of ancient personae, both real and mythological. Alexander is associated and identified by a lion's hide on his head and shoulders, as can be discerned in the fibula. His father, Philip II, is recognized in iconography by wearing an elephant hide.

Yankee Doodle Rides Again

I READ WITH GREAT ENJOYMENT your Spring 2000 issue of *Rotunda* magazine. Particularly enjoyable was the "Mocking the Macaroni" article. I found, however, I was humming *Yankee Doodle Went to Town* a lot afterwards, and with a little verbalizing, realized it was because it had the macaroni reference! The mind is full of surprises. I had never understood this rhyme until now.

Macaroni here refers not to the Italian pasta, but to something that might be worn by a fop, a macaroni. Purists will therefore prefer the reading: And called *him* macaroni.

I thought a footnote on this might have added a humorous touch to your fine article.

BARRY ESPIN
TORONTO, ONTARIO

THE BEST SEATS IN THE HOUSE

*Two 18th-century stools recently acquired by the ROM
were part of a set designed by celebrated artist and architect William Kent*

Objects designed by William Kent are extremely rare. The two Kent stools below, a detail of which is shown here, are among the most important furniture pieces in the ROM's collection.



BRIAN BOYLE, ROM

IN JULY 1998, the ROM's Department of Western Art and Culture refused an export permit application for two 18th-century stools. Official permits are required for the export of Canadian heritage items and for significant non-Canadian artifacts that have been in Canada for 35 years or longer. Research revealed that the stools were

part of a known set of furniture designed by the celebrated English artist and architect William Kent (1685–

PETER KAELLGREN

1749). With his patron, Lord Burlington, Kent was responsible for popularizing the style of the Italian Renaissance



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architect Andrea Palladio (1501–1580) and launching the Palladian style that dominated British architecture for most of the 18th century.

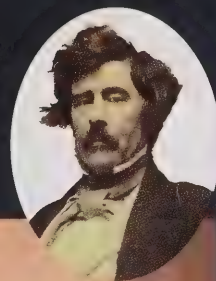
It was clear that items of such importance should not be leaving the country. The focus of collecting today is increasingly on pieces that can be documented in terms of their designers, makers, patrons, and history of ownership, and it turned out that this pair of stools was part of an extremely well-documented group of furniture made for the Lodge at Sherborne House in Gloucestershire. In 1728, Lord Sherborne (Sir John Dutton, d. 1742) asked William Kent for designs for some improvements that he was making at this country estate. Kent was working for the Crown at Kensington Palace at the time and was attracting a number of important commissions. Ultimately, in October of 1731, James Moore II, the son of the cabinetmaker who had executed Kent's designs for George I, delivered a suite of mahogany furniture to Sherborne House. This included a pair of benches with backs and arms, four stools, and nine chairs, all with board seats. These were for the banqueting room at the lodge, a large pleasure building in the grounds executed about 1650 to the designs of the celebrated architect Inigo Jones (1573–1652).

The furniture remained at Sherborne House until 1940 when the current Lord Sherborne decided to dispose of it on the London antique market because his estate had been requisitioned by the government to house troops. Temple Newsam House in Leeds purchased the pair of benches. These were the most important pieces since they correspond closely to an engraved plate in *Some Designs of Mr. Inigo Jones and Mr. William Kent*, a book published in 1744 in London by Kent's follower John Vardy. The rest of the furniture was sold to a variety of collectors. The late Christopher Gilbert, who curated the Leeds collection and was among the founders of the Furniture History Society, was able to document the set fully from the

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COMING IN THE WINTER 2000 ISSUE

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Francesco Santini examines new deep-sea evidence that may help to answer the age-old question.



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Sherborne archives. Gilbert's article published in *The Burlington Magazine* (March 1969) illustrated a bench, a chair, and a stool from the suite.

During the 1720s, mahogany began to be imported from the Caribbean into England. Cabinetmakers found that this strong, beautiful wood, which was available in wide boards, was ideal for furniture-making. Increasingly, mahogany became the preferred wood for the best furniture and remained so for dining-room furniture until the late 1800s.

The legs of the stools are carved from solid mahogany. To get a solid block of wood of the correct size, a front leg on one of the stools was made from two separate pieces that were glued together. The top, the pierced symmetrical scroll and acanthus leaf motif at the front, and the carved frieze of the apron are also solid mahogany. To conserve the expensive wood and strengthen the structure, the apron itself is constructed of an oak frame with a thick layer of mahogany glued to the surface. The leaf and scroll motifs at the sides are carved from oak, possibly red oak from America, and stained to look like mahogany. In that location, the substitution would not have been easily detected. This careful and economical use of woods is typical of the craftsmanship of the best English cabinetmaking.

Following standard 18th-century practices, all carving is confined to the visible parts of the stools. The backs were left plain because they stood against the wall, either in the window niches of the banqueting room or in niches along its inner wall.

A further subtle refinement was detected when the benches were measured. The seat is not a rectangle with four 90-degree corners. Rather, the chair's back legs were placed more widely apart than the front, an arrangement that allows the carved aprons and the frieze on the sides to be more visible.

In 1969, Christopher Gilbert located one pair of stools in the Ben-

jamin Sonnenberg Collection in New York, but could not account for the other two. In 1943, they had been purchased by Dr. William Lawrence Glen from Leonard Knight Ltd. of London, England. Dr. Glen, who was a prominent chemist specializing in pharmaceutical research, had been carefully collecting period furniture and antiques since the mid-1930s. In 1944, he married a Canadian, Norah McGinnis, who was a fellow graduate student at Oxford. Ultimately, the Glen family emigrated to the Montreal area with the collection.

In their home, the amply proportioned stools served admirably as end tables. After Dr. Glen's widow died in 1997, the collection was consigned to Phillips International Auctioneers and Valuers, with whom the ROM was able to negotiate a purchase, after having refused the export permit application.

Half of the purchase price came from a grant from the Canadian Minister of Heritage on the recommendation of the Canadian Cultural Property Export Review Board. The other half came from the Louise Hawley Stone Charitable Trust.

These stools are some of the most important furniture that the Royal Ontario Museum has ever acquired. Objects designed by William Kent are extremely rare and seldom appear on the international market. When they do, there are many museums that are prepared to pay anything to acquire them. The ROM is extremely fortunate to have access to the income from Mrs. Stone's munificent bequest. One of the stools is currently on display beside the sideboard table from Kirtlington Park, Oxfordshire, at the south end of the Samuel European Galleries.

Peter Kaellgren is curator in the ROM's Department of Western Art and Culture, specializing in British and European decorative arts from 1500s onward.

From the book *Louise Hawley Stone: A Life and Legacy* (ROM 1999).

LIFE ON EARTH

EARTHWORM ECOLOGY

Why these invertebrates are essential to making your garden grow

DO YOU RECALL dissecting an earthworm in high-school biology class? If so, you may remember that these animals lack a skeleton and are basically a tube-within-a-tube: the inner tube is the digestive tract and the outer tube the muscular body wall. For some of you, handling a slimy, squirmy invertebrate may not have been a pleasant experience and you may have dismissed the earthworm as repulsive and unimportant. But, in spite of their relatively unappealing appearance and simple structure, earthworms are vital to the health of our backyards.

If you toiled in your vegetable garden this spring, hoping to produce a bumper crop, I'm sure you ran across the ubiquitous earthworm. Its presence plays a key role in maintaining the well-aerated and nutrient-rich soil your plants need to bloom in abundance and produce higher yields of vegetables. Often referred to by zoologists as nature's plow, earthworms are beautifully designed to ram through soil. The muscles in a worm's body wall contract in waves, first moving the head forward through the soil followed by a "pulling up" of the tail. They happily ingest everything in their path—their ability to digest organic matter in the earth they swallow means that earthworms can consume plant matter, protozoans, rotifers, nematodes, bacteria, fungi, and the decomposing remains of other animals.

Their digestive tracts will readily pass even coarse material such as sand without injuring the worm.

As the animal burrows through the soil, it leaves behind a mucous path, which later hardens, preventing the tunnel from collapsing. Because earthworms may number up to 1.2

ways in which roots may take hold.

Even an earthworm's waste products are helpful to gardeners. Called casts, these wastes appear as dark, squiggly-shaped piles of earth that



The beneficial effects of worms are due mainly to their large numbers. Earthworms, like these two that are mating, reproduce quickly and are hermaphroditic.

million per hectare of land, they produce a vast, interconnected web of channels, which allows rainwater to penetrate the topsoil. (The number of worms found in a typical hectare could potentially tunnel 50,000 km (31,000 miles) in a single year!) Without the worms' activity, rainfall would tend to run off the surface of the soil instead of being absorbed,

appear to have been squeezed from a tube, like toothpaste. Take a close look at the surface of your garden bed one morning and you might discover evidence that worms have been tilling your soil the previous night. Generally speaking, earthworms produce their own weight in casts each day, and it is estimated that they can generate up to 18.4 tonnes (18 tons) of castings per year in a single acre of land. As soil is granulated with casts, it becomes looser, providing spaces between soil particles for root growth, boosting young seedlings' chances of survival.

Casts also provide nutrition for growing vegetation. Nutrients that are not absorbed by a worm's tissue are excreted in its casts. If we were to chemically analyze uneaten soil and earthworm casts from a particular site, the casts would contain higher levels of the nutrients a growing plant needs.

DON STACEY

quickly resulting in soil erosion and crop drought. The burrows also aerate the soil and provide large passage-

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One such experiment revealed that casts contained 5 times the nitrate, 7 times the available phosphorus, 3 times the exchangeable magnesium, 11 times the potash, and 1.5 times the lime that occurred in uneaten soil from the top 15 cm (six inches) of a field. The increased nutrients can be attributed to the organic debris processed by the earthworms.

In addition to their agricultural importance, earthworms perform the vital task of composting refuse. Those of you who have a composter in your backyard are probably already aware of the ability of earthworms to transform household garbage and garden wastes into useful humus for soil improvement. By composting, earthworms help us decrease the amount of waste we send to landfill sites.

Of the 19 earthworm species found in Ontario, 17 are non-native. Most native species were eliminated by glaciers that blanketed the province until about 10,000 years ago. The introduced species were transported from Europe to North America by settlers over the past 350 years and consequently they are found primarily in and around populated areas. In both urban and rural settings, earthworms provide food for a wide variety of animals, including birds, moles, hedgehogs, foxes, toads, and snakes. Centipedes, beetles, slugs, and flatworms also feed on them. Thus, earthworms comprise an integral link in the food chain.

These useful soil dwellers are of economic importance to the sport fishing industry in North America. The dew worm or nightcrawler, *Lumbricus terrestris*, is collected from golf courses and pastures in Ontario to be sold as live bait. Unwelcome on the links, as their casts produce bumpy putting greens, dew worms are collected at night when they exit their burrows to feed, mate, and seek new areas to inhabit. On a favourable night, up to 10,000 worms can be picked by one person. Approximately a billion dew worms are exported from Ontario to the United States

every year, representing a market worth \$25 million to \$30 million.

The beneficial effects of earthworms are primarily attributable to their large numbers. Earthworms reproduce quickly and are hermaphroditic, meaning each individual has both male and female reproductive organs. Two earthworms mate by coming together with their undersides facing each other and their heads pointing in opposite directions. In most cases, the male apparatus of each worm directly opposes the sperm receptacle of the other. This allows sperm to be simultaneously transferred between the worms.

A few days after copulation, each worm will secrete a tough ring around itself in the area of the clitellum, the conspicuous dark band that encircles a worm near its head. The ring is a cocoon in which the animal deposits eggs. When the worm pulls backwards, sperm is injected into the cocoon as it passes over the sperm receptacle and then over the worm's head. Once detached, the cocoon's open ends constrict and seal up. In most species, each cocoon normally produces one or two worms. The exception is the manure worm, *Eisenia foetida*, whose cocoon can yield as many as 11 individuals. Earthworm cocoons are drought resistant and will remain dormant until there is enough moisture and warmth to permit hatching.

From their interesting reproduction to their vital roles in recycling nutrients, maintaining well-aerated and fertilized soil, and being a source of food for other fauna, there is much more to the earthworm than meets the eye. Upon closer examination, we find an animal that is important to gardeners, farmers, and wildlife. While we may not appreciate the appearance of these slimy, subterranean soil dwellers, we can certainly value their usefulness.

Don Stacey is a technician in the invertebrate section of the ROM's Centre for Biodiversity and Conservation Biology.

STARGAZING AND SIKH ARTS

**Summer Stargazing:
A Practical Guide for Recreational Astronomers**

Terence Dickinson

(Firefly, Cloth: \$18.95)

Although perhaps not an age of light, the world after Edison is at least an age of wattage. Before the tungsten filament was a glimmer in the inventor's eye, the stars were the first thing to be noticed at night, not the last. Historically, English vernacular reflected the presence of the stars through a host of star words: starbeam, stardust, stargaze, star-shower, and star-struck among them. Poets routinely invoked the stars' potent luminosity: the Irish bard Yeats—full of regret—urged his ex to remember "a little sadly, how love

fled, and paced upon the mountains overhead, and hid his face in a crowd of stars." Even pop icons—as disparate as Vincent van Gogh and Don Maclean—have found inspiration in starry, starry nights.

It is not surprising, then, that popular astronomer (and International Dark Sky Society member) Dickinson continues his war on light pollution, much of it, "so-called security lighting," including "empty shopping centre parking lots that are floodlit all night" and "streetlights that glare into the eyes of distant drivers."

Fortunately for many, summer means cottage country and at least a temporary return to dark skies. At my own summer home, near Tweed, On-

tario, the only appreciable surface light is a distant haze over Belleville, on the Bay of Quinte, to the south. *Summer Stargazing* is a step-by-step guide to discovering, or rediscovering, the night sky, a book that will enhance any summer.

**Wonderful Things:
Uncovering the World's Great Archaeological Treasures**

Edited by Paul G. Bahn

(Weidenfeld & Nicolson, Cloth: \$50)

On first peering into the tomb of Tutankhamen, archaeologist Howard Carter is said to have remarked, "I see wonderful things!" Humanity's need for beauty, and the impulse to create it, are mirrored in this cache of treas-

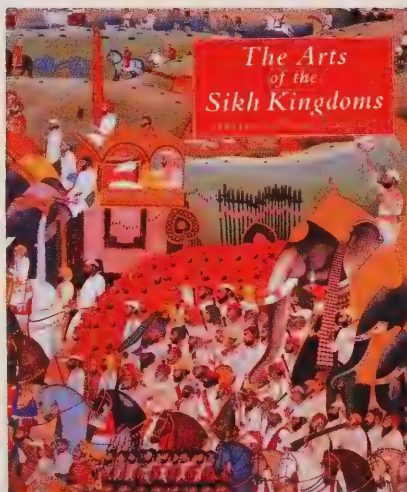
F E A T U R E R E V I E W

The Arts of the Sikh Kingdoms

Edited by Susan Stronge

(Weatherhill, Cloth: \$75)

The ROM's earliest planners patterned the Museum largely on London's Victoria and Albert, an international museum of art, archaeology, and natural history. The latest link between these sister institutions was *The Arts of the Sikh Kingdoms*, an exhibition developed by the V&A to commemorate the tricentennial of a watershed event in Sikh history, the creation of the *Khalsa*, the Order of the Pure. The companion publication, a collaboration by experts on Sikh history, culture, and religion, preserves the exhibition, showcasing its magnificent polychromatic art. It also adds contextual



depth. The chapter on the sacred *Harmandir* will particularly interest those who visited the exhibition at the ROM; a model of the shrine has been on extended loan to the Museum, from the British Royal Family, since 1939. It was for many the highlight of the show.

Also of interest: The ROM exhibition added more than 40 artifacts from its own and other Canadian collections. Seema Bharadia, an assistant curator at the Museum, has compiled a complementa-

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ures drawing from 28,000 years of history. Hidden from human gaze for centuries or millennia, many of the items were rediscovered suddenly and unexpectedly. Stone-age African rock art, prehistoric Japanese pottery, pre-Christian Irish gold, and textiles of the Andes are interspersed among well-known treasures such as the Rosetta Stone, the gold of Troy, the statues of Menkaure, and the Portland Vase. Items of adornment—especially pendants and pectorals in gold, amber, or jet—are abundant, often found as grave goods to ensure safe and stylish journeys from this world to the next. Most frequently represented is the human form itself, in a myriad of renderings, from the stylized ice-age *Venus of Willendorf* to the realistic (but mysterious) Lady of Elche and the idealized bronzes of Riace.

Charlevoix County, 1930

Jori Smith

(Penumbra Press, Cloth: \$19.95)

Recently, the ROM published Donald Blake Webster's *Rococo to Rustique: Early French-Canadian Furniture in the Royal Ontario Museum*. The collection was founded in 1931 when Marius Barbeau, the pioneer of French-Canadian decorative arts study, purchased room panelling at Saint-Jean-Port-Joli for ROM director Charles Currelly. In *Charlevoix County, 1930*, we encounter Barbeau journeying through the Charlevoix countryside, recording and preserving all manner of folk art and tradition. A. Y. Jackson painted villages in the area, as did the author of this account, Jori Smith, and her husband, Jean Palardy. Palardy's seminal *The Early Furniture of French-Canada* ultimately began there as well. One of the photographs in *Charlevoix County, 1930* shows Smith in her summer kitchen, an early Quebec armoire to her right, bought solely because she and Palardy needed it. She remarks: "That is how we began our extraordinary collection and Jean's passion for antiques." Smith's eyewitness account of another time brings to life the painted villages of rural Quebec.

Lake Simcoe and Lake Couchiching

Mary Byers

Photographs by John de Visser

(Boston Mills Press, Cloth: \$40)

Long before the islands and shores of these lakes became fabled cottage country, they were the fabled ancestral lands of Huron, Iroquois, and Chipewa (also called Ojibwa or Anishnawbe). Native mythology relating to this area has endured into the present. In Basil Johnston's *The Star-Man and Other Tales* (ROM, 1997), an elder recalls a magic bolt of light pulled from a tree—like Excalibur from stone—as well as serpentine water monsters, one of which lives "in the hill just north of where the old Indian portage from Lake Simcoe enters West Bay, Balsam Lake" and another "in the hill at Atherley on Lake Couchiching." They are said to travel through subterranean passages to the lakes "and can sometimes be seen early in the morning."

Mary Byers is to be commended for her sensitivity to the issue of successive human occupation of these waters. *Lake Simcoe and Lake Couchiching* could have become merely a celebration of big cottages and big boats. Instead, it is a chronicle of generations, a sepia study of yesterday, a panegyric to vanished childhood summers. The archival images include ROM patriarch Sir Byron Edmund Walker at "Broadeaves" on De Grassi Point in 1912, and literary lion Stephen Leacock (shuffling cards, possibly) at a gathering on his verandah at Old Brewery Bay. The archival material is complemented by John De Visser's evocative contemporary studies, everything from snow on a wrought-iron gate to girls' summer hats, banded with silk flowers. Aficionados of heritage watercraft will especially appreciate the windows through time to a world of steamers and paddle boats, winter ice-sailing, and summer regattas.

Glen Ellis is head of Publications, Royal Ontario Museum.

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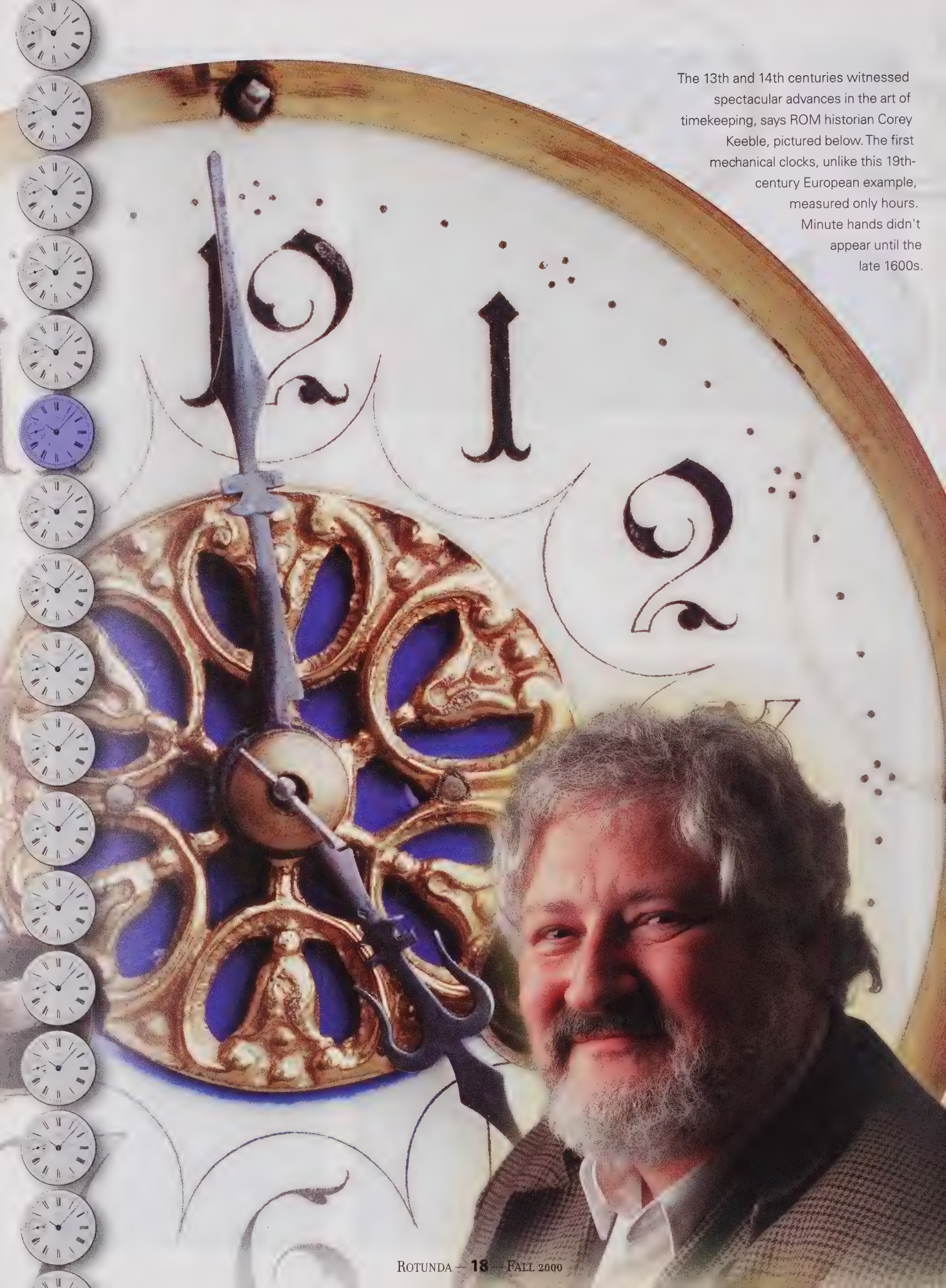
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The 13th and 14th centuries witnessed spectacular advances in the art of timekeeping, says ROM historian Corey Keeble, pictured below. The first mechanical clocks, unlike this 19th-century European example, measured only hours. Minute hands didn't appear until the late 1600s.

PUZZLE OF TIME

SINCE
THE DAWN OF HUMAN HISTORY,
THE BRIGHTEST MINDS HAVE STRUGGLED
TO UNDERSTAND TIME'S BEGINNINGS—AND TO
MEASURE ITS
PASSAGE. DESPITE
ENORMOUS
STRIDES, PRECISE
READINGS STILL
ELUDE US.

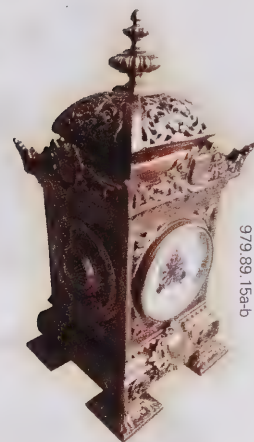
Time began long before Bear Woman of the Peigan tribe got away. It began before the year Seven Reed when Mexico's Mixtec people crawled out of the earth of Chicomoztoc. Time began when the sun emerged from the igloo, bearing a torch, and rose to the sky, when God created the Heaven and the Earth, or in 3761 BC, according to the Hebrew calendar. Time began 20 to 40 million years ago according to 19th-century physicist Lord Kelvin, or 15 billion years ago, give or take a billion or two, according to modern cosmologist Stephen Hawking.

Geologist Don Davis, managing director of the ROM's Jack Satterly Geochronology Lab, draws a comparison between science and origin myths. "Myths are very powerful," he says. "They shape our consciousness." Science, he posits, like a mythology of old, merely offers a concept of how we came to be. If, as Shakespeare wrote, "What's past is prologue," then our quest to locate the first moment in time, the universal clock's first tick, is a quest to know our most fundamental selves. It's a quest that crosses the boundaries of religion and science, with roots that go deep into antiquity.

Since early in human history, people have grappled with the notion of time. Humanity's deepest thinkers have struggled to answer two deceptively simple questions: how do we measure time—a puzzle that over the millennia has spawned a surprising variety of timepieces and calculations—and when did time begin—a question that has stymied us through the ages.

Cosmologists and astronomers such as Hawking and the ROM's Tom Clarke explain the beginning of time through the concept of singularity, which is defined as an event of such magnitude that it completely rewrites the rules of physics—an apt description of the Big Bang. "Nothing would have survived the Big Bang," says Clarke, who is head of special projects at the Museum. "There's no way of knowing what happened before it." If time did exist before the Big Bang, we would have no way of measuring it.

Had astronomers shifted their gaze from their slide rules to the writings of Augustine of Hippo, in North Africa, they might have come up with the concept of singularity long before the dawn of the 20th century. In his *Confessions*, written in 397–398 AD, Saint Augustine had the notion almost figured out. "Before he made Heaven and Earth, God made nothing," he wrote in Book XI of his work. "You made all time; you are before all time; and the 'time,' if such we may call it, when there was no time was no time



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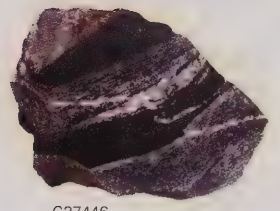
By Mark Sabourin | Photoillustrations by Jim Panou

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Microscopic crystals of zircon, seen faintly in the background on this page, are extracted from rocks. By weighing the isotopes of uranium and lead they contain, geologists like Don Davis, left, can determine the rock's age. At 4.03 billion years, the rock at right, the Acasta Gneiss, is the oldest one known.



G37446

at all.”

Since long before Saint Augustine, humankind's beliefs represented the height of anthropocentrism: we placed ourselves at the centre of creation. The popular belief in a 6000-year-old creation—roughly coinciding with the beginnings of recorded history—was so strong that it presented a considerable challenge to the findings of biologists and geologists who, by the late 1700s, began suggesting that the Earth was much older than previously supposed. Defenders of a young universe hardly needed the considerable support lent to their cause by the work of James Ussher, a 17th-century cleric and scholar.

The Archbishop of Armagh, Primate of All Ireland, and vice-chancellor of Trinity College Dublin, Ussher revisited biblical texts, did the math, adjusted as best he could for variations in the calendar, and concluded that time began on Sunday, October 23, 4004 BC. The authority of his chronology, published in Latin in 1650 and in English eight years later, only gained momentum when it was repeated in countless editions of the Bible. His influence is felt profoundly to this day.

Corey Keeble, curator of European history at the ROM, is not bothered so much by the burden Ussher's legacy has placed on such colleagues as geologist Don Davis. What irks Keeble is that James Ussher may not have understood what God meant by a day. “Ussher accepts everything in scripture in terms of human understanding,” laments Keeble. “A day in the existence of God is not necessarily a day in our existence,” he says. “A day in the life of God could be billions and billions of years.”

Had Bishop Ussher shared Keeble's insights into divine horology, the scientific forbears of Davis might have been successful in pushing back the age of the Earth faster than just a few hundred million years at a time. Geologists had begun chipping away at Ussher's proposition late in the 1700s. By the mid-1800s, they had concluded that the Earth could be many hundreds of millions of years old, possibly of unlimited age.

One of their contemporaries, the physicist William Thomson, later to become Lord Kelvin, disagreed. He urged geologists to look up to the skies, and for close to 50 years he succeeded in discrediting their theories. Thomson's calculations, based on the luminosity of the sun and the cooling history of the Earth, set firm limits—20 to 40 million years—on the age of the Earth.

As the 19th century rolled into the 20th, a growing understanding of radioactivity gave geologists the evidence they needed to correctly explain the Earth's temperature—invalidating the basis for Thomson's calculations—

and their focus

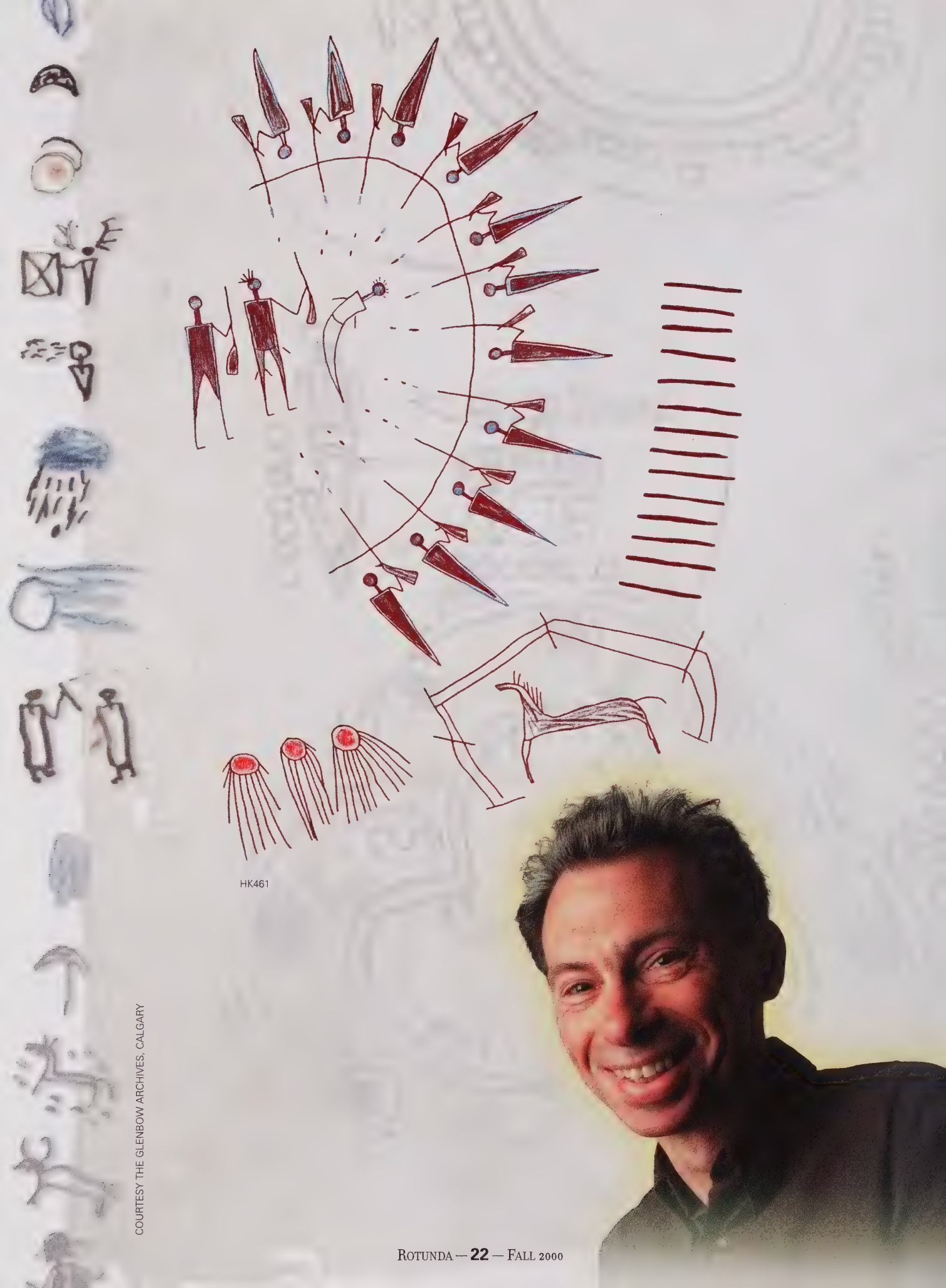
returned to the rocks underfoot. Around 1906, physicist Lord Rutherford performed experiments with radioactive uranium that dated the rocks in question to half a billion years old.

Deep in the ROM's basement, in the Jack Satterly Geochronology Lab, Don Davis runs processes that are the successors to Lord Rutherford's work. Far beneath the galleries—with their fossilized feet of hadrosaurs and the excited footsteps of schoolchildren—Davis and his lab-mates reduce rock to dust, extract microscopic crystals of zircon, and weigh the isotopes of uranium and lead that they conceal. Once done, Davis is able to stamp the rock with an age: a relatively young 1.556 billion years here, a greying 2.76 billion years here, an ancient 3.831 billion years here. The whole process can take a couple of weeks, says Davis, and each dating will cost a client between \$3000 and \$4000. In the ROM's geochronology lab, time is money.

Davis likes to point out the lab's sample of the Acasta Gneiss, the oldest rock ever recovered, mined from a spot in the Canadian north midway between Yellowknife and the Arctic Ocean. For the first 500 million years of the Earth's history, Davis says, the universe hurled meteors at it the way children throw stones at an abandoned warehouse window. Nothing from that era is likely to have survived, he says, so at 4.03 billion years of age, the Acasta Gneiss may be as old a terrestrial rock as we're likely to find.

The Earth's rocks trace their ancestry to a supernova, which may trace its own lineage back to the very instant of a creation, a moment that astronomers and cosmologists say happened 12 to 15 billion years ago. “We've got it pretty close,” says Tom Clarke, of cosmology's 3-billion-year discrepancy over the date of creation. When discussing the age of the universe, Clarke tosses around years like dollars in Bill Gates's stock portfolio. He can be forgiven a measure of imprecision. After all, astronomers still aren't certain what time it is.

At least since the early Sumerians, people have been occupied with measuring time. Five thousand years ago, the Sumerians devised an annual calendar of 12 30-day months, with days divided into 12 periods, each corresponding to approximately two of our hours. But the Babylonians and the Egyptians are variously credited with devising the system that stuck. As early as 3500 BC, they divided the daylight

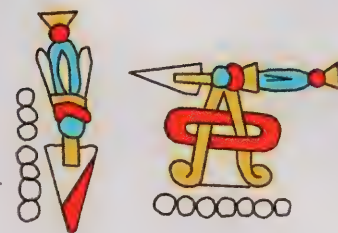


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COURTESY THE GLENBOW ARCHIVES, CALGARY

A sequence of glyphs from Peigan chief Bull Plume's "wintercount," shown left, begins with the year "when the short-haired white men first came," about 1784. At right is a date glyph "seven reed day, seven reed year" marking an event on the Mixtec people's Lienzo of Tlapiltepec.

Above ROM anthropologist Arni Brownstone, left, is his redrawing of Bull Plume's war exploits recorded on a ROM buffalo hide.



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into

two equal periods, explains Randall Brooks, curator of Physical Sciences and Space at Ottawa's National Museum of Science and Technology. Each half was then subdivided by six, being one-tenth of the base-60 numeric system they used. Dividing the hour and the minute, each by 60, naturally followed.

The Sumerians and the Babylonians came up with the units of measurement for time, but they never figured out how to make a measuring stick. Although it is likely that the passage of time had always been noted through the movement of shadows, the Egyptians are believed to have been the first to attempt to make time yield to human measurement. Egyptian shadow clocks from the 15th century BC were devices in the shape of the letter "T," with the crosspiece elevated to cast a shadow on the units of time marked on the stem. Over the centuries, these shadow clocks would give way to sundials, which became increasingly sophisticated. With their development, people began to look downward, not upward, to tell the time.

Shadow clocks and sundials would later be supplemented by other, more ingenious devices meant to wrest the measurement of time from the whims of the heavens. Waterclocks, striated candles, and graduated incense burners were used in various parts of the world. But they were difficult to regulate and, like sundials, imprecise. The first mechanical clocks were devised sometime in the 1300s. They measured hours—minute hands wouldn't begin to appear on them until the late 1600s. As for second hands, they wouldn't be commonly used for at least another 100 years.

Measuring annual cycles offered an entirely different challenge. Lunar cycles, though predictable, didn't coincide with important changes in nature. Counting the phases of the moon wouldn't tell an Egyptian when the Nile would flood. In Inuit lore, the moon is unscrupulous, immoral, molesting his sister the sun and causing her to flee to the sky in horror and shame. It's just as well that the Egyptians cut him out of the equation. Instead, they fixed upon the Dog Star, which the Inuit call Singuriq and we call Sirius, and noted that it rose next to the sun every 365 days, just as the Nile began to flood. They came to this realization around 4236 BC, perhaps the earliest recorded year in history.

A number of cultures, however, even today rely on the moon to mark the years. In the Islamic, or Hirji, calendar, each of the 12 months begins with a sighting of the lunar crescent after a new moon. A year spans a little more than 354 days, regardless of the Earth's position in its orbit

around the sun.

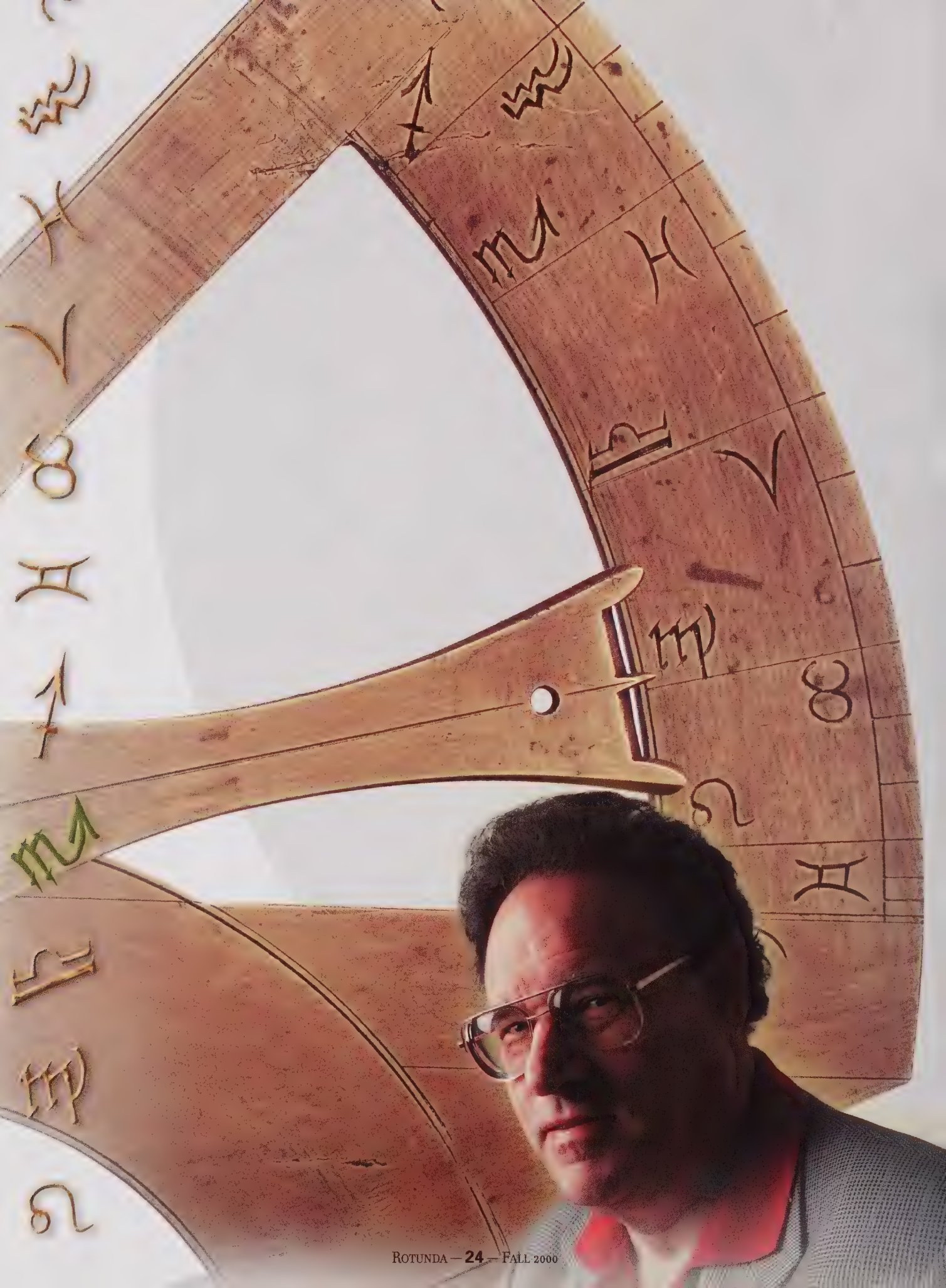
Until quite recently, the Inuit relied on what John MacDonald, research director of the Igloolik Research Centre, in Igloolik, Nunavut, calls an "eco-calendar." The calendar merged events in the natural world—the return of the sun, the nesting of birds, the break-up of the sea-ice—with the phases of the moon. Moon-months were not fixed, however, and were allowed to vary in length depending upon the arrival of the expected natural events. Thus, explains MacDonald, the moon-month the Inuit called Manniit, which means "eggs," might have straddled lunar cycles depending upon the arrival and nesting of birds.

North American Plains Indians followed a similar practice, explains ROM anthropologist Arni Brownstone. Lunar cycles marked the passage of time, but they were described in terms of changes in nature: the month (or moon) when the strawberries come out, or the month when the grass turns green. Brownstone shuffles through a folder of photocopied sheets from his bookshelf and points to a crude image of rainbows. A year, he says, was measured or counted in terms of winter. Each year was described in a "wintercount" not by a number, but by a memorable event: the year Elk Bull died, the year Bear Woman got away, the year of many rainbows.

Other cultures, those whose social and scientific heritage traces from Egypt, Greece, and Rome, have tried to shape time to suit their religious, military, political, or scientific needs. Before Julius Caesar's decree in 45 BC that a year would span 365-1/4 days, Roman years varied in length depending on the whims of priests and the demands of conquest. But time would not yield even to Caesar's will. Every 128 years following his decree, a one-day error accrued on his calendar, prompting Pope Gregory XIII in 1582 to shorten Caesar's year by approximately 10 minutes and order that 10 days be dropped from the month of October that year.

Knocking 10 minutes off the average year would mean little to most of us today. It meant even less to Europeans of the late 1500s. At the time that Gregory XIII reshaped the calendar, sundials and water clocks had only recently yielded to mechanical clocks. The arrival of these new devices owed little to a need for more accurate timekeeping and more to a revolution in our appreciation of the relationship between Creator and creation.

It's a moment in history, likely one of many, that



Sundials like the example at right replaced the earliest timepieces—Egyptian shadow clocks invented in the 15th century BC. Today's astronomers like the ROM's Tom Clarke, left, rely on atomic clocks to test complex theories about "space time" and expansion of the universe.



sparks

enthusiasm in ROM historian Corey Keeble. The early Middle Ages are marked by "some radical and extraordinary changes in human thought," says Keeble. The 13th and 14th centuries witnessed spectacular advances in the art of timekeeping, he says, largely because of the influence of Thomas Aquinas, who argued that God could be discerned through human reason. From this proposition arose the early stages of scientific inquiry, the reintroduction of Aristotle's philosophy, and the quest to invent.

"By the 1400s," says Keeble, "late medieval society is absolutely obsessed with the whole concept of invention. That means a fascination with mechanics, and it means a fascination with wheels and gears and anything that turns." Examples of this still exist throughout Europe in spectacular astronomical clocks in such places as Prague, Strasbourg, and in the Cathedral at York.

Astronomical clocks gave not only the hour of the day, but also the sign of the zodiac, the position of the planets, and the phase of the moon. In that sense, they served to maintain a relationship between time and the heavens. But the development of clocks represented an important leap: time no longer depended upon heavenly light, but on a weight, or a spring, or as Galileo Galilei predicted and Christiaan Huygens discovered in 1656, the swing of a pendulum.

The mechanical clock was welcomed by the Christian churches, says Tom Clarke. Monasteries embraced the new timepieces as the means to ensure that the orders of the day were properly followed. Clocks were mounted on cathedrals. This period also marked the beginning of the estrangement of reason from faith, says Keeble, delighted at another of history's profound ironies: by stressing the importance of the God-given human mind, Aquinas unwittingly sowed the seeds of an objective science that would no longer be the handmaiden of religion.

The Egyptians were the first to cast their eyes downward to measure time. But with the advent of mechanical clocks, the divorce from the skies seemed complete. In 1927, to better mark the passage of time, inventors turned from the swinging of a pendulum to the vibration of quartz crystals.

The next development, arrived at in 1967, is still the best solution anyone has found. It reduced time to the predictable quiverings of sub-atomic particles. That same year, at the 13th General Conference of Weights and Measures, the second was redefined as "9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium-133

atom."

It's precision purchased at the cost of elegance.

For most of us, concepts like Hubble Constant, singularity, space-time, and imaginary time are too abstract to grasp and are best left to the devices of astronomers and physicists. Tom Clarke ambles through them as easily as a beekeeper at a hive. But when pressed about what time really is, he chuckles and shrugs. "We can measure time, we can track it, but all that does is give us the illusion that we understand it." The best definition, he says, isn't found in the realm of sub-atomic particles or in the wisdom of Newton or Einstein or Hawking. Instead, Clarke paraphrases Woody Allen: "Time is nature's way of making sure that everything doesn't happen at once."

However you define time, its passage is now recorded, nanosecond by nanosecond, by 180 atomic clocks in 25 countries around the world. They tick with unerring precision and have allowed us to test such theories as Einstein's Special Theory of Relativity, which posits that time is not constant but is relative to speed and position. This new understanding of time's ephemeral nature is what led cosmologists to the concept of "space-time," notions of an expanding universe, the Big Bang, and speculations about our place in creation.

These precise timepieces also allow scientists to compare astronomical time—by the Earth's position in the heavens—against that recorded by atomic clocks. And, every 18 months or so, astronomers sigh in resignation and admit that time is not where it ought to be. Amazingly, the length of a day or a year still cannot be predicted to the precision demanded in a modern age. For reasons that strain understanding and defy prediction, every once in a while, atomic time and astronomical time fall out of sync. Small and unpredictable changes in the Earth's rotation are almost certainly at work—along with variations in the gravitational influence of the sun, moon, and planets in the Earth's annual orbit. But the discrepancies may also result from the heating and cooling of the atmosphere, the wind buffeting the Himalayas, or the beating of a butterfly's wings. Whatever the reason, whenever they occur, scientists must reset the world's atomic clocks, adding or subtracting a second. To do so, the timekeepers of the world do as did the Peigan, the Mixtec, and the Inuit, the ancient Romans and Egyptians, and all of humankind since the sun fled the igloo. They turn their eyes heavenward to tell the time. ~

By Mark Engstrom and Judith Eger

SQUIRRELS HAVE ALWAYS BEEN

OF PESKY RACCOONS, SKUNKS, AND

Wild IN THE CITY

AROUND TO DELIGHT TORONTONIANS.

HUGE NUMBERS

OR HAVE THEY?

overhead in the trees along

our streets, annoying us with their evening garbage-can raids, or leaving behind a waft of tell-tale odour, wild animals are a familiar presence in the city. So familiar, in fact, that we tend to view urban wildlife populations as stable and unchanging. Surely the squirrels that inhabit our neighbourhoods with such populous zeal have always been here.

But the idea of stability is illusory. In reality, the numbers and varieties of mammals living in Toronto's ravines, parks, green spaces, and back-

yards are in constant flux. Over time, as climates shift, as humans alter the environment and introduce new kinds of animals, and as the geographic distributions of native species naturally expand and contract, the configuration of wildlife populations in the city changes too. But over the past 200 years, more than anything else it has been the increasing momentum of urban development that has caused numerous species to disappear from the Golden Horseshoe and new invaders to appear—sometimes dramatically—on the scene.

ILLUSTRATION BY CHRISTINE BUNN / SHARPSHOOTER



In Toronto's more distant past, massive climate shifts were the driving force behind large-scale faunal changes. Twelve thousand years ago, the area was a barren landscape just released from the crushing weight and frozen expanse of the great Laurentide glaciers as they retreated northward. The mammal community at that time was more typical of a subarctic climate. It was an odd mix of modern northerly species—such as caribou, musk ox, and arctic fox—together with now-extinct prehistoric mammals—such as woolly mammoth, mastodon, and giant beaver, which today are found mainly as plastic prizes in children's cereal boxes.

Ten thousand years ago, warmer conditions similar to those of today prevailed, allowing a modern group of mammals to thrive. About 7000 years ago, the Toronto area was enveloped in a deciduous forest of oak, elm, maple, beech, hickory, and hemlock. The floral suite changed yet again about 600 years ago, when white pine invaded the area during a mini-ice age.

Throughout the last 10,000 years, local wildlife shared living space with Native peoples who had continuously occupied the region. The first peoples to reach the Toronto area were following the retreating edge of the ice sheets in search of caribou herds. Their hunting and fishing had little lasting effect on the surrounding environment. By the early 1400s, agriculture had spread to the region. Although small tracts of land were slashed and burned to make way for farming, the limited size of the population minimized any long-term environmental impact. By the mid-16th century, the population in what is now the Greater Toronto Area (GTA) was perhaps 10,000. The fossil record of mammal populations at this time remained scattered, but we do know that white-tailed deer were plentiful, providing a primary source of meat.

In the 1640s, the local populations of Huron, Petun, and Neutral Indians were devastated by the measles and smallpox introduced by European explorers and missionaries—up to

half of the Natives died. The region was then annexed by the Iroquois and served as an unoccupied buffer zone between nations until 1700, when treaties allowed the Mississauga and Ojibwa to resettle there. In 1720, present-day Toronto supported just three villages with about 750 people. Then began a period of French (1720–1759) followed by English (1760 to present) settlement and occupation. By the mid-1800s, European settlement had reached the point where local Native people could no longer make a living at hunting and fishing.

Faunal records suggest that the mammals in Toronto in the early- to mid-1800s were different from those found here today. Many mammals that now occur only in the less populated areas north and east of the city were regular denizens in 1835. Black bear, grey wolf, Canada lynx, bobcat, marten, fisher, and snowshoe hare all occupied unsettled areas in the city. Stories of encounters with these mammals abound, such as an account from the early 1800s—recorded by E. T. Seton in *Lives of Game Animals* (1925)—of two carriage horses that attacked a black bear in their pasture, located at the head of John Street. Even the now-long-gone eastern cougar was an occasional city visitor. Sometime before 1820 a “fine large panther” was shot in Scarborough, and there is an account in Seton's book of “...a man called Burkholder having a fight with a panther on Baldwin Hill [now in the city of Toronto] in 1826.”

On the other hand, river otter and beaver, both of which were probably fairly common before European settlement, had already become rare by 1835. Wapiti, or elk, present in the Toronto region up until the mid-1700s, disappeared soon after Europeans arrived. With the French and English came new animals. The much-loathed Norway rat and house mouse, pests that continue to plague the city today, were introduced from Europe. By 1835 they were flourishing.

Meanwhile, because of Toronto's excellent harbour and rich farmland, the European population grew rapidly—and

ACCIDENTAL TOURISTS — VIRGINIA OPOSSUM

Listed as an accidental species in J. H. Fleming's *The Natural History of the Toronto Area* (1913), the Virginia opossum was first recorded in Toronto in 1858. Since then, these long-snouted marsupials have invaded Ontario from Michigan, travelling east along Lake Erie, and from northern New York, following the Niagara escarpment as far north as Owen Sound. According to the Toronto Wildlife Centre, opossums are now reported from Burlington as far east as Etobicoke. They arrived in a series of waves, no doubt associated with shifts in weather. Some urban opossums show evidence of frostbite on the ears and tail, suggesting that one or more severe winters could eradicate resident populations.



With a large whitish head and narrow snout, a long, naked, prehensile tail, black leathery ears, and hind feet with opposable thumbs, this marsupial is best known for its habit of “playing possum” or feigning death when attacked. As a scavenger, it enjoys a wide range of food, from fruits, nuts, and grains to earthworms, arthropods, and vertebrates, including carrion. Like most mammals, the opossum is nocturnal. Although its preferred habitat is deciduous forest with permanent water, the opossum has adapted well to agricultural areas and to the urban environment. It may be only a matter of time before the delightful prospect of opossums populating the many ravines of Toronto becomes reality.

Native people were further marginalized. After 1840, the destruction of local wildlife habitats became extensive and continued apace through the turn of the 19th century. The population of York, which stood at 760 in 1816, had grown to 9000 by 1834 when the settlement was renamed Toronto and incorporated as a city, and to 31,000 by the mid-century census. By 1913, the number had leapt to half a million, and the population density in the city had effectively destroyed much of the natural wildlife habitat.

Black bear, grey wolf, Canada lynx, marten, fisher, river otter, beaver, porcupine, and snowshoe hare were gone from the city proper. Some mammals, which today appear to have staged a comeback, were gone or on the decline. White-tailed deer, now common in some of the larger ravines in the city, were recorded as "formerly common, exterminated [by] . . . 1837" in J. H. Fleming's 1913 *The Natural History of the Toronto Region*. Grey squirrels (both black and grey phases) — whose abundance and predilection for disrupting the best-laid plans of gardeners and bird watchers today precipitate no end of calls to the ROM — were reported in 1913 to be "formerly common, becoming scarcer."

Despite this exodus of species, there was a silver lining. Development in previously unbroken areas of forest and wetlands brought some new mammals to the Toronto area. Cottontail rabbits, denizens of forest edges and fields, emigrated from Michigan or upstate New York sometime in the late 1880s and had grown common by 1913. Canada's only marsupial, the Virginia opossum, was first recorded in Toronto in 1858, though populations were still not established by 1913 (see sidebar, page 28).

Subsequently, a few other mammals have secured a foothold in the Toronto region, some through a natural expansion in range, others by introduction. The coyote, or brush wolf as it is often locally known (see sidebar, below),

by 1956, had come to occupy most parts of the province, including the Toronto area. The European hare, accidentally introduced in 1912, became established throughout the southern part of the province, including Toronto, by 1930.

Since 1913, areas surrounding the city have steadily been developed. Already by the 1930s, the effects of deforestation on groundwater supplies were recognized as a serious problem. Nonetheless, the pace of expansion accelerated noticeably when Metropolitan Toronto was formed in 1953—and it has continued unabated ever since. Today there are 4.3 million people in the GTA, and the population is expected to reach 6.5 million by 2021. This growth will extensively alter environments, fragmenting and eliminating natural habitats, polluting water and soil, increasing erosion, and introducing exotic pests.

Undoubtedly our mix of native and introduced mammals will continue to fluctuate as development spreads. Large mammals tend to be the ones most greatly affected by urban sprawl. Conspicuous and easily harassed, large mammals such as elk and black bear require the greatest amount of uninterrupted green space, and some, especially large carnivores such as eastern cougar and wolf, are seen to be in direct conflict with the interests of people. Nonetheless, some of these mammals—those that are able to adapt to the presence of humans and prefer a mosaic of disturbed and less modified habitat—have flourished (the brush wolf and the white-tailed deer, for example).

Inevitably, when the environment is disturbed, habitats become simplified—even forested green spaces such as ravines are structurally less complex than untouched wilderness—and overall species diversity in plants, animals, and other organisms is reduced. Some species cannot cope with these conditions and disappear. For others, novel food sources and denning possibilities, coupled with the absence of competition and predation, are a boon and their numbers

KING OF THE URBAN CARNIVORES—COYOTE

The coyote, or brush wolf, was originally an animal of the open plains of western North America. With settlement — and elimination of other large carnivores—this adaptable beast has found its way into most areas of the continent. Its territory spans the Northwest Territories all the way east to New Brunswick and as far south as Panama. By 1900 the coyote was firmly established in northwestern Ontario. From there, the species spread, reaching Lakes Ontario and Erie by 1956. With the disappearance of the grey wolf from the Toronto area 100 years ago, the coyote has taken its place as the carnivore supreme, adapting well to urban and suburban development. Coyotes are most visible in late spring when they are



searching for food and establishing dens. Coyotes live singly, in pairs, and in packs. Food supply is the main factor influencing both social arrangements and territories. The presence of coyotes has been firmly established in Toronto's Downsview lands, filtering down the ravines to areas such as the Leslie Street Spit and High Park. Three coyotes living in the park this past winter made the local television news as dog owners wondered, with good reason, about the safety of their pets. Many Toronto residents accept their new canine neighbours. However, pet owners in the High Park vicinity are encouraged to leash their dogs, keep their cats indoors, and refrain from feeding the coyotes.

greatly increase. Many of these are conspicuous and well-known to even the most casual observer. Grey squirrels, once considered rare, have prospered to the point of occa-

sional nuisance, as have raccoons and striped skunks.

Other species, such as red fox, red squirrel, eastern chipmunk, muskrat, and woodchuck have also held their own, as

CHANGES IN THE MAMMAL FAUNA OF THE GREATER TORONTO AREA

	Species	Common Name	Toronto 1835	Toronto 1913	Toronto 1948	Toronto 1994	Mammal Checklist to record your own sightings
Opossums	<i>Didelphis virginiana</i>	Virginia opossum		accidental *	*	*	<input type="checkbox"/>
Insectivores	<i>Sorex cinereus</i>	Common shrew	*	*	*	*	<input type="checkbox"/>
	<i>Sorex fumeus</i>	Smoky shrew				*	<input type="checkbox"/>
	<i>Sorex hoyi</i>	Pygmy shrew				*	<input type="checkbox"/>
	<i>Sorex palustris</i>	Water shrew					
	<i>Blarina brevicauda</i>	Northern short-tailed shrew	*	*	*	*	<input type="checkbox"/>
	<i>Parascalops breweri</i>	Hairy-tailed mole	*	rare		*	<input type="checkbox"/>
	<i>Condylura cristata</i>	Star-nosed mole		*	*	*	<input type="checkbox"/>
Bats	<i>Myotis leibii</i>	Eastern small-footed bat	*	*	*		<input type="checkbox"/>
	<i>Myotis lucifugus</i>	Little brown bat			*	*	<input type="checkbox"/>
	<i>Myotis septentrionalis</i>	Northern long-eared bat			*	*	<input type="checkbox"/>
	<i>Lasiurus borealis</i>	Red bat		*	*	*	<input type="checkbox"/>
	<i>Lasiurus cinereus</i>	Hoary bat	*	rare	*	*	<input type="checkbox"/>
	<i>Lasionycteris noctivagans</i>	Silver-haired bat		*	*	*	<input type="checkbox"/>
	<i>Eptesicus fuscus</i>	Big brown bat		*	*	*	<input type="checkbox"/>
Carnivores	<i>Canis latrans</i>	Coyote			*	*	<input type="checkbox"/>
	<i>Canis lupus</i>	Grey wolf	*				
	<i>Vulpes vulpes</i>	Red fox	*	*	*	*	<input type="checkbox"/>
	<i>Ursus americanus</i>	Black bear	*	*			
	<i>Martes americana</i>	Marten	*	*			
	<i>Martes pennanti</i>	Fisher	*	*			
	<i>Mustela erminea</i>	Ermine	*	*	*	*	<input type="checkbox"/>
	<i>Mustela frenata</i>	Long-tailed weasel		*	*		
	<i>Mustela vison</i>	Mink		*	*	*	<input type="checkbox"/>
	<i>Lontra canadensis</i>	River otter	*				
	<i>Mephitis mephitis</i>	Striped skunk	*	*	*	*	<input type="checkbox"/>
	<i>Procyon lotor</i>	Raccoon	*	*	*	*	<input type="checkbox"/>
	<i>Puma concolor</i>	Cougar					
	<i>Lynx canadensis</i>	Canada lynx	*	*			
	<i>Lynx rufus</i>	Bobcat	*				
Even-toed ungulates	<i>Cervus elaphus</i>	Elk					
	<i>Odocoileus virginianus</i>	White-tailed deer	*			*	<input type="checkbox"/>
	<i>Alces alces</i>	Moose					<input type="checkbox"/>
Rodents	<i>Tamias striatus</i>	Eastern chipmunk	*	*	*	*	<input type="checkbox"/>
	<i>Marmota monax</i>	Woodchuck	*	*	*	*	<input type="checkbox"/>
	<i>Sciurus carolinensis</i>	Eastern grey squirrel	*	*	*	*	<input type="checkbox"/>
	<i>Tamiasciurus hudsonicus</i>	Red squirrel	*	*	*	*	<input type="checkbox"/>
	<i>Glaucomys sabrinus</i>	Northern flying squirrel			*	*	<input type="checkbox"/>
	<i>Glaucomys volans</i>	Southern flying squirrel	*				
	<i>Castor canadensis</i>	Beaver	*	*	*	*	<input type="checkbox"/>
	<i>Peromyscus leucopus</i>	White-footed mouse	*	*	*	*	<input type="checkbox"/>
	<i>Peromyscus maniculatus</i>	Deer mouse	*	*	*	*	<input type="checkbox"/>
	<i>Clethrionomys gapperi</i>	Red-backed vole	*				
	<i>Microtus pennsylvanicus</i>	Meadow vole	*	*	*	*	<input type="checkbox"/>
	<i>Ondatra zibethicus</i>	Muskrat	*	*	*	*	<input type="checkbox"/>
	<i>Rattus norvegicus</i>	Norway rat	*	*	*	*	<input type="checkbox"/>
	<i>Mus musculus</i>	House mouse	*	*	*	*	<input type="checkbox"/>
	<i>Zapus hudsonius</i>	Meadow jumping mouse	*	*	*	*	<input type="checkbox"/>
	<i>Erethizon dorsatum</i>	Porcupine				*	<input type="checkbox"/>
Rabbits and Hares	<i>Sylvilagus floridanus</i>	Eastern cottontail		*	*	*	<input type="checkbox"/>
	<i>Lepus americanus</i>	Snowshoe hare	*	rare			
	<i>Lepus europaeus</i>	European hare			*	*	<input type="checkbox"/>

Compiled from: the ROM Centre for Biodiversity and Conservation Biology's mammal database; Federation of Ontario Naturalists' *Atlas of the Mammals of Ontario* (J. Dobbyn, 1994); ROM's *Checklist of the Mammals of Ontario* (Downing, 1948); *The Natural History of the Toronto Region* (J. H. Fleming 1913); *The Zoological Journal* "Dr. Gapper on the Mammalia of Upper Canada" (N. A. Vigers, 1835)

have a myriad of small, nocturnal mammals such as white-footed mouse; meadow vole; northern jumping mouse; northern and southern flying squirrels; short-tailed, masked, and pygmy shrews; star-nosed and hairy-tailed moles; big and little brown bats; and hoary, red, and silver-haired bats. Urban ravines, old fields, and backyards often teem with the visages of these small mammals, (see chart, page 30), but barely do they register in the collective consciousness. Unless of course a white-footed mouse decides that she, not you, is mistress of your flat, or moles excavate intricate networks of tunnels in your previously well-manicured lawn (We would advise abandoning the lawn to the moles).

These species are adaptable survivors, and if they sometimes appear to exist in plague proportions, we have only our own reduction of local biological diversity to blame. What goes around may come around to roost in your attic.

Finally, some of the new invaders may offer the greatest surprises. Many people have never seen a European hare, yet these animals are common in many ravines and river-side parks. Other species that now live in Toronto's out-

skirts may become established in the city. The Virginia opossum is likely to become a common non-taxpaying city resident within the next 20 years. Deer and brush wolves are likely to penetrate more deeply into the city. And we may be paid the odd visit by some old friends, such as bobcat, American marten, beaver, porcupine, or river otter.

And, we cannot discount the unexpected. After all, a moose was shot at the Scarborough GO Station in the 1980s (perhaps Toronto mayor Mel Lastman's current campaign to promote tourism by installing fibreglass moose throughout the city isn't totally inappropriate), nutria—rodents that look like muskrats and are native to South America—have been introduced to central Ontario, and a cougar was reported near the Toronto Zoo and adjacent ravines in 1996. The future is difficult to discern, particularly in the face of unprecedented urban sprawl, global warming, and other catastrophic environmental events. But if the past is a harbinger of the future, change rather than stability will be the order of the millennium for Toronto's mammals—as it has been since the slate was wiped clean by great sheets of ice 12,000 years past. ●

URBAN MAMMALS AND RABIES: ARE WE AT RISK?

Some mammals, such as raccoons and squirrels, flourish so well in urban settings that they become more common in cities than in the countryside. Does this proliferation of wildlife pose a significant threat to human health? Some Ontario mammals can contract two well-known viruses that may be passed to humans—rabies and hantavirus. Hantavirus, which causes a potentially deadly respiratory disease, is carried mainly by deer mice. Though the threat is small, reasonable precautions should be exercised when dealing with deer mice in the home (see "Deer Mice and the Hantavirus," Summer 1998 *Rotunda*). As for rabies, the magnitude of the problem and the species that carry the virus have changed over the years.

Historically, red fox populations have exhibited the highest levels of rabies. During the 1980s, they accounted for 45 percent of all rabies incidences in Ontario (20 percent of cases were skunks, 20 percent were cattle, and 10 percent were dogs and cats). In 1989, the Ontario Ministry of Natural Resources implemented an oral vaccination program for foxes, and the number of rabies cases in Ontario foxes has declined from 2000 records per year in the 1980s to fewer than 100 per year since 1997. Although red foxes are readily seen in the ravines and neighbourhoods of Toronto, rabies contracted from foxes is no longer a serious concern.

Skunks and raccoons—which can also become rabid—are numerous in the Greater Toronto Area. A strain of rabies that has long been established in raccoon populations in the southern United States has recently found its way

north and become entrenched in upstate New York. In Ontario, the first incidence of this type of rabies was confirmed in July 1999 and as of March 2000, 23 raccoons carrying the virus have been found in the Brockville area. Since 1994 and 1995, the Ministry of Natural Resources has carried out a vaccination program in the Niagara Falls area and in the region from Kingston to Cornwall. The program, which involves trapping, vaccinating, and releasing raccoons, will be enhanced this year: one million baits treated with rabies vaccine specific to the new strain will be dropped in eastern Ontario. As of May 2000, there have been no cases of rabies in the raccoons living in the Toronto area.

Bats, too, have potential to transmit rabies. The highest incidence of the infection is found among big brown bats, which are often found roosting in the attics of houses in Toronto. Each year, between 20 and 50 cases of bats with rabies are found across Ontario, a rate that has remained stable over the past 20 years.

Despite the number of rabies cases among Ontario mammals, there are no recent records of the disease being transmitted to humans in the province. In the United States, an average of one to two people die of the virus (which is fatal, once symptoms commence) each year. So, although the probability of contracting the disease is very slim, all wild animals should be treated with caution. Where practical, avoid direct contact, don't approach too closely, and never handle a wild mammal that appears disoriented or ill.

COURTESY THE WOODLAND CULTURAL CENTRE MUSEUM



From left to right: Oronhyatekha as Supreme Chief Ranger of the IOF; a young Oronhyatekha in his traditional Mohawk suit, the one he wore to greet the Prince of Wales in 1860; painting by Les Claus of Oronhyatekha and driver leaving The Pines; Oronhyatekha wearing his Good Templar medals; Mrs. Eva Maracle.

FROM ANTHROPOLOGY ARCHIVES



In the 19th century, he was a prominent MD and CEO who held sway with cabinet ministers and belonged to secret societies.

BEFORE MY INTERVIEW WITH EVA MARACLE, what I knew of Dr. Oronhyatekha, the successful Mohawk doctor and insurance man who moved as easily in Victorian society as in Native circles, was at best from second-hand sources. It had been gleaned from photographs, newspaper clippings, and Oronhyatekha's book entitled *History of the Independent Order of Foresters*, a somewhat tedious account of the fraternal life insurance company's struggles and phenomenal rise to international success under his direction.

What intrigued me most was the book's account of an exchange that had occurred a few years after Oronhyatekha joined the IOF. Membership in the order was re-

stricted to white males and as a Mohawk, Oronhyatekha was ineligible. Yet in 1878, he was granted admission through "special dispensation." Still, some detractors sought to have him expelled, pointing out at a meeting of the membership that the IOF constitution's intent was "to exclude applicants who belonged to a race which was considered inferior to the white race." Without missing a beat, Oronhyatekha quipped to the assembly that his admission was legalized because "they recognized the fact that I belonged to a race which is superior to the white." The next year, in 1881, he was elected as the organization's CEO, or supreme chief ranger, a position he would hold until his death in 1907.

Oronhyatekha



He was a Mohawk who never lost sight of his identity.

By Keith A. Jamieson

But more than his indomitable spirit intrigued me. The wealth of documents Oronhyatekha left behind, and the Oronhyatekha Historical Collection of artifacts, which he had amassed in his lifetime and is now housed at the Royal Ontario Museum, gave me enough of a glimpse of the doctor to want to learn more. I got the chance when Tom Hill, director of the Woodland Cultural Centre Museum in Brantford, Ontario, where I am curator, told me of a plan to collaborate with the ROM on an exhibition about the doctor. The idea started to take shape when I chanced to meet curator Trudy Nicks while at the ROM on other business, and we swapped Dr. "O" stories. *Mohawk Ideals, Victorian Values: Oronhyatekha, M.D.*, is scheduled to open at the WCC

29 July 2001 and travels to the ROM in 2002.

I first heard about Eva Maracle while researching the exhibition at a series of community sessions planned by the WCC. Band members were invited to share their recollections, personal possessions, and stories that had a connection to Oronhyatekha. The doctor and his wife, Ellen Hill, who belonged to a prominent Mohawk family, had several children, but only two survived to adulthood and no direct descendants remain today to tell Oronhyatekha's story. The meetings took place at Six Nations Reserve near Brantford, Ontario, where many of the doctor's extended family still live, and at Tyendinaga Mohawk Reserve near Belleville, Ontario, where he moved in 1864 following his marriage.

The diminutive Mrs. Maracle, a spry, vibrant Mohawk woman, 104 years young when I spoke with her in 1998, grew up on Oronhyatekha's estate. Eva was 13 years old when Oronhyatekha died in 1907, and she recalled with an enviable clarity life at The Pines, Dr. Oronhyatekha's home at Tyendinaga, where her father was a caretaker of the estate and farm. She and her childhood friends would go to the homestead to see Oronhyatekha's exotic live animal collection.

Eva told me how awed she felt of the big man who divided his time between The Pines and a place called Forester's Island—the site of his other home, The Castle, where he spent most of his time, and a turreted orphanage that Oronhyatekha had founded. She remembered how he'd swept into The Pines like a whirlwind, generating activity. Though he often hosted influential guests from around the world at The Castle—people like the Earl of Aberdeen—the only language he permitted at The Pines was Mohawk.

Though I had acquaintances at Tyendinaga before the community sessions took place, my own roots are at Six Nations. Travelling and visiting between the two communities is frequent, but residency at one reserve does not guarantee unfettered access to the other. After the first meeting at Tyendinaga, Mrs. Ella Claus approached me. It turned out she knew my parents quite well. This was excellent luck because family connections are one of the best ways to qualify your acceptance into a Native community. Once this connection was confirmed, the ice was broken and I was able to move about Tyendinaga with much greater ease.

The meetings, which at times broke into lively sessions of reminiscing, immeasurably furthered my understanding of the life and times of Oronhyatekha. Both communities claimed ownership of the man and set about proving the connections. Genealogical evidence was quickly tabled. But disdain and suspicion of the showy self-promoter—and accusations about his character and his actions—also surfaced. There was a sense that he was "arrogant and pushy" and a distrust of his affiliation with many secret societies, including the Good Templars, a sect of the Masons. But more significantly, some felt that he was to blame for losses of land at Tyendinaga. Some believed that in the private meetings he was known to hold with cabinet ministers at the IOF headquarters, he had somehow negatively influenced policy at Indian Affairs.

Born at Six Nations on August 10, 1841, Oronhyatekha was baptized Peter Martin, the eighth in a family of nine children. From early on he preferred his Mohawk name—which translates as "Burning Sky." He was heard on occasion to remark, "There are thousands of Peter Martins, but there is only one Oronhyatekha."

He was trained as a cobbler in the Mohawk Institute, a residential school for Native children at Six Nations. It was there that he first encountered the Reverend Nelles who ran the school and served as the Church of England's agent. The Reverend's recommendation was sought by the Iroquois Confederacy Council when deciding which students should



COURTESY THE WOODLAND CULTURAL CENTRE MUSEUM

Clockwise from top left: The orphanage founded by Oronhyatekha on Forester's Island; Oronhyatekha visiting his mentor Sir Henry Wentworth Ackland; The Temple, IOF headquarters, in daylight and at night; The Castle, Oronhyatekha's home on Forester's Island; Oronhyatekha with a group of orphans and their attendants.

be financially supported while away from the community. The privilege was granted to only 12 children in each generation. Oronhyatekha was denied this support—and expressed his ire of Nelles in a later autobiographical sketch.

But when Oronhyatekha was 14, an American phrenologist travelling through the reserve probed the boy's cranium and proclaimed him educable. Oronhyatekha's family was reluctant to send him to college. Higher study was a perilous undertaking for any Native person in Canada at the time. Those who attained a level of education higher than that offered by the residential schools without the authorization of



COURTESY THE BODLEIAN LIBRARY, OXFORD



the New England Company (the Church of England's representative in Canada) were stripped of their status and nationhood and "awarded" full Canadian citizenship. They were no longer permitted to live on the reserve.

But Oronhyatekha was determined to accompany the phrenologist. He managed to convince Nelles and his family to let him go and ended up at Wesleyan Academy in Wilbraham, Massachusetts. He took a program of missionary studies, which he graduated from two years later. Oronhyatekha was compelled to return home between semesters, as were other Native students attending colleges in the United States at the time, because lengthy absences from the reserve were also grounds for loss of status. After graduating from Wesleyan, he went on to further religious studies at Kenyon College, in Ohio. To raise the needed funds for his continued education, the ever-resourceful Oronhyatekha became a fairly successful stage actor and promoter. His roommate at Kenyon, A. B. Rockwell, mentions Oronhyatekha in his autobiog-

raphy, noting that although Oronhyatekha rarely studied, he had a photographic memory and made excellent grades. He completed the four-year program in three years.

Soon after completing college Oronhyatekha was offered the opportunity to attend Oxford University, but completed only one semester there. He had left the Six Nations reserve early in 1862 without Reverend Nelles's permission and was forced to return, but he did not go back to Six Nations. He began teaching at Tyendinaga. He continued his education at the University of Toronto and in 1866 was awarded a medical degree.

The doctor enjoyed a phenomenal degree of success by any standard. He was one of the first of Native ancestry to graduate as a medical doctor, he was named a justice of the peace, he was appointed consulting physician at Tyendinaga by Sir John A. MacDonald, and he became chairman of the Grand Indian Council of Ontario and Quebec—just a few excerpts from the list of accomplishments, awards, and citations that actually prompted a notation about him in a Ripley's Believe It or Not newspaper column in the late 1960s. What was perhaps most remarkable about the man was not that he achieved success in the Victorian world but that he did so with his Mohawk heritage intact.

For Native people in North America, the 19th century was a time in which maintaining their conventional social, political, and religious forms and structures was a difficult if not an impossible struggle. The institutions and governments of the Victorian era saw First Nations peoples as an impediment to the prosperity of a fledgling Canada. The "Noble Red Man" was part of the past, and Darwinian theories of natural selection and extinction were thought to apply to First Nations peoples. By the mid-1800s, the pressures of racially inspired policies and practices were taking their toll, not least upon the Iroquois Confederacy's Mohawk, Onondaga, Cayuga, Seneca, Oneida, and Tuscarora Nations.

In response, the Mohawk people adopted a highly nationalistic stance centred on their language, weaving the social, political, and religious structures of the Victorian world into the fabric of their own language and cultural practices in a bid to maintain their sovereignty. Already in the late 1700s, the Bible had been translated into Mohawk, and now societies and associations affiliated with benevolence and fraternalism took hold and prospered within Native communities. In 1870, Tyendinaga became the first Native community in Canada to elect their political leadership.

By the end of the 19th century, Mohawk nationalism had engendered many individual successes, Oronhyatekha among them. He was able to use his humanitarian ideals as a buttress against the intolerance that marked the Victorian era, and even to use Victorian institutions as the vehicle with which to promote those ideals.

Oronhyatekha's original plan had been to become a missionary teacher, a career he was still considering when he returned to the reserve in 1860, after graduating from Kenyon College. While teaching at Six Nations later that

same year, at the age of 19, he was invited to present a welcoming address to the visiting Prince of Wales, later King Edward VII. Oronhyatekha gave an eloquent speech in both Mohawk and English, and at six-foot-three he cut an impressive figure in his full Mohawk outfit. Sir Henry Wentworth Ackland, then the regius professor of medicine at Oxford University, and the young prince's physician, was also an aspiring artist and invited Oronhyatekha to pose for his sketches. Ackland inquired whether Oronhyatekha was a chief, and if so, whether the position was elected or hereditary. With his unerring knack for sensing an opportunity, Oronhyatekha replied "Sometimes one, sometimes both, sometimes neither." In truth, he was neither, but Ackland was charmed and became a mentor and fast friend. Their relationship would last the rest of their lives.

It was after this meeting that Oronhyatekha determined to become a doctor himself. He practised medicine both on the reserve and in Ontario's Victorian society for more than a decade. But before long, he became more interested in his societies and abandoned his medical practice.

When Oronhyatekha joined the IOF in 1878, the order was promoting itself under the banner of "Liberty, Benevolence and Concord." It was a struggling group beset by factionalism and facing steep debts. Armed with a solid academic background, and with the flair and confidence of a showman, Oronhyatekha was ready to make his mark as supreme chief ranger.

During his tenure, Oronhyatekha led the struggling order to international success. He succeeded in extending the benefits of insurance to the average person at an affordable rate. Previously, insurance had been a privilege available primarily to the well-to-do. In 1891, he persuaded the organization to permit women to participate as full members, and later he extended benefits to the children of deceased members. (He also was possibly the first to require candidates to pass a medical examination to qualify for insurance.)

In his travels as supreme chief ranger, Dr. Oronhyatekha did as did all good Victorians—he collected. But he didn't restrict himself to acquiring the typical cabinet of curiosities. He amassed more than 800 artifacts and natural history specimens. The Oronhyatekha Historical Collection was heralded in *The Toronto Star* on September 10, 1902, as "The Beginning of a Very Valuable Museum, Founded by the Supreme Chief Ranger," when it opened in the Oronhyatekha Historical Rooms in The Temple, the world headquarters of the IOF located at Bay and Richmond streets in Toronto.

The collection was an appropriate reflection of Oronhyatekha himself. It proclaimed the prestige and status accorded a world traveller to places foreign, and was as random as it was eclectic, combining items for serious study in social and scientific fields—such as a Norwegian hand mangle accompanied by a discussion of artistic decoration of household implements—with others that were simply exotic or bizarre—including such "Curios From Foreign Parts" as boomerangs, Japanese shoes, and a platypus specimen.



Above: The brass compass and silver belt medal were both owned by Tecumseh, the Shawnee ally of British General Sir Isaac Brock during the period around the War of 1812. According to Oronhyatekha's 1904 catalogue, one of Tecumseh's warriors, Ojibwe Chief Oshawana had the inscription added by a Detroit jeweller after Tecumseh's death. Coat: Chief John Tecumseh Henry wore this suit of clothing when he greeted the Prince of Wales in 1860 on behalf of the Carodoc Indian Reserve.

Dr. "O"'s Imperial Connections

OF ALL OF THE ROM'S VAST HOLDINGS, the collection assembled by Dr. Oronhyatekha must rank among the most interesting. In his role as head, or supreme chief ranger, of the IOF, Dr. Oronhyatekha travelled extensively and amassed a large, eclectic collection of more than 800 artifacts and natural history specimens. A catalogue published in 1904 lists the wonders that awaited visitors to the Oronhyatekha Historical Rooms and Library. According to the catalogue, the collection was intended to encourage "education, increased interest in history, nature, and art, and beyond all, thought and reading in the Home." Of particular interest are the objects that



Above: The Nile Campaign medal was awarded to Joseph LeBlanc of Kahnawake, P.Q., one of the Iroquois boatmen recruited by the British government to take boats of soldiers over the cataracts of the Nile in the attempt to relieve the siege of Khartoum. The Indian Chief's uniform is one of two red coats attributed to Oshawana, "a Chippewa warrior of the Carodoc reservation." The sterling silver gorget was awarded by order of King George III to Joseph Brant (1742–1807), Mohawk leader and British ally during the U.S. War of Independence.

record the historical relationships between the British Crown and the First Nations in the Great Lakes region. In 1860, Oronhyatekha, on behalf of Six Nations, greeted the Prince of Wales, then on a North American tour. In his speech he reminded the royal visitor of the chain of friendship that had existed between the Iroquois and the Crown "for more than 200 years." The objects Oronhyatekha collected in later years, including a replica of the coronation chair at Westminster Abbey, reflect his life-long interest in royal connections. Many other objects like the ones above record important historical events in which Native peoples participated as allies of the British and as sovereign nations in their own right.

—Trudy Nicks is curator in the ROM's Department of Anthropology

The collection, whose classification in large measure is credited to George Mills McClurgue who was hired for the purpose, offered an appreciation of ages-old relationships between peoples, specifically in North America.

There is little doubt that by juxtaposing the artifacts of his own life with those of Joseph Brant, Tecumseh, and many other celebrated First Nations leaders, Oronhyatekha was angling to ensure his own immortality. But the Oronhyatekha Historical Collection did something more important. A sense of sovereignty has long been part of Iroquoian history. It is the people's present and its future. As Trudy Nicks has pointed out, James Clifford surmised in his 1988 book, *The Predicament of Culture*, "resourceful Native Americans might soon appropriate the Western museum." Oronhyatekha was already working on that vision a century earlier. Committed to the ideals of his heritage, Oronhyatekha accepted the responsibility of defining his own history.

At Christ's Church, Tyendinaga, where Oronhyatekha is buried, a historical plaque still stands in his memory. He is also honoured in the "Canadian Indian Hall of Fame" collection housed at the Woodland Cultural Centre Museum. His son, Ackland, died only a few months after his famous father, leaving only Oronhyatekha's daughter, Bena. When she died in 1939, furnishings and other possessions were sold through estate auction, including his traditional Mohawk outfit, which has since been located in the Los Angeles County Museum.

In 1911, the Oronhyatekha Historical Collection was donated by the IOF to the ROM, then part of the University of Toronto. Unfortunately, it was dispersed into departmental collections according to region of origin, which included the Mediterranean World, the Far East, Africa, Oceania, Europe, and the Americas, thus burying its most compelling aspect—what it tells us about the man who collected it.

Now, almost 100 years away, collaboration and cooperation between institutions is providing an opportunity to revisit a time and a place that might otherwise have been lost. Thanks to the joint WCC/ROM project, pieces of the collection are being reunited at the ROM and some of Oronhyatekha's personal effects and furniture are turning up from basements and attics at Tyendinaga and Six Nations.

During my last visit to Tyendinaga, Ella Claus showed me a small collection of family snapshots and artifacts, including two watercolours of Oronhyatekha painted by her late husband, Les Claus. The first is of the doctor and his driver leaving The Pines, his magnificent home. The second was unique and most impressive; it was of the place Eva Maracle had mentioned—Forester's Island. Originally known as Captain John's Island, the property had belonged to Ellen Hill's family. It is a small island in the Bay of Quinte across from what was then known as Mill Point, now called Deseronto. The painting shows an array of buildings of various architectural styles, appearing almost as a kind of Victorian theme park. While the buildings have long since disappeared, the painting seems to hint at a mythical quality to Oronhyatekha's life—castles floating in the mist in the shadowy dusk of late fall. ●

a toast to Greece's

ΕΙΣ ΥΓΕΙΑΝ ΤΟΥ ΕΛΛΗΝΑ

*We may not drink it sweet,
with two parts water,
as did the ancient Greeks.
We may not aspire to the
overindulgences of their
symposia. Still, when
it comes to wine, we share
much in common with
history's early oenophiles.*

BY PAUL DENIS

PHOTOGRAPHY BY BRIAN BOYLE, ROM

WHEN HE APPEARED in the towns of ancient Greece, women were seized by a strange compulsion to drop their work and follow him into the wooded hills. Enraptured by the sense of ecstasy he emanated, they would roam the countryside dancing wildly, swinging torches and thyrsi (staves with clusters of vine leaves or ivy at their tips), tearing apart and devouring animals or even humans that crossed their path.

If it sounds suspiciously like a cult, it was—the cult of Dionysos, the mythological Greek god of wine and revelry.

We know of his frenzied followers from ancient scribes and from such artifacts as a 4th-century BC bell krater, or wine mixing bowl, from the ROM's Greek collections. The bowl depicts a scene of women, maenads (the god's female followers), and satyrs (mythical forest creatures, half-goat/half-man) in the throes of Dionysiac tempest,



beating tympanums, and dancing furiously.

In spite of the mayhem he unleashed, the god of wine was celebrated in ancient Greek society, where the beverage played an important role in much the same way as it does today. Ancient Greeks drank wine for pleasure, as part of social gatherings, and even for therapeutic purposes, as Teiresias in Eripides' *Bacchae* eloquently eulogizes:

original vintner

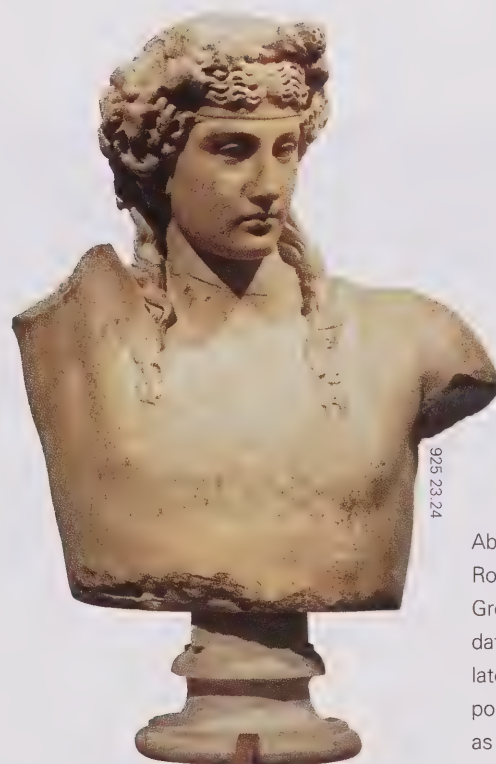
Θ Ε Ο Υ Τ Ο Υ Κ Ρ Α Σ Ι Ο Υ



92058.72 / 919X13.21 / BACKGROUND IMAGE: COURTESY OF THE KIMBLE ART MUSEUM

"Filled with that good gift, suffering mankind forgets its grief; from it comes sleep; with it oblivion of the troubles of the day. There is no other medicine for misery."

Today we may have a wider variety of antidotes for sorrow, but our love of wine endures. For those who appreciate the nectar of the grape, rooting through viticulture's beginnings yields intriguing stories both from



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Above: This Roman copy of a Greek sculpture dating from the late Classical portrays Dionysos as an ideal young man.

the realm of myth and the record of history.

The multi-faceted Dionysos—sometimes known as Bacchus—who was also associated with fertility and the underworld, was the son of the powerful god Zeus and the mortal woman Semele, daughter of Kadmos of Thebes. Before the child's birth, Semele was tricked by a jealous Hera, the divine consort of Zeus, into asking Zeus to appear before her in his full majestic glory. Being only human, Semele died instantly when Zeus complied. But he was able to rescue the unborn Dionysos from her womb and attached the foetus to his thigh. Months later, Dionysos was born from his father. A scene on the interior of a kylix, or wine-drinking vessel, from the 5th century BC depicts Zeus handing over a rather chubby baby Dionysos, who is grasping a bunch of grapes, to Hermes, the messenger god. According to legend, Hermes deliv-

Left, background: A kylix depicts Pentheus being torn limb from limb by a band of frenzied women. Foreground, right: Dionysos is represented as an elderly bearded man on this amphora from the 6th century BC; left: The god of wine's followers are captured in the throes of Dionysiac tempest on this 4th century BC Apulian bell krater.

ered the infant to the nymphs of Mt. Nyssa, said to be in Thrace, to be raised. It was from there that the adult Dionysos started out on his mission of bringing wine and *orgeia* to the people of Greece.

Numerous myths tell of Dionysos spreading both viticulture and his ecstatic cult throughout the country—and of the gruesome consequences that befell those who failed to believe in his divinity. Perhaps the most famous story comes from Euripides' *Bacchae*. When Dionysos arrived at

It's perhaps not surprising that the god of viticulture, like wine itself, had a dark side. But because Dionysos had shown the Greeks how to cultivate, harvest, and ferment grapes into wine, he was held in high regard.

Given this ancient people's love of wine, it's no wonder Dionysos and his band of unruly followers abound on the wine vessels they used for storage, serving, and drinking. In fact, the god's imagery appears in almost all Greek media. In the visual arts, the likeness of Dionysos did not remain static.

During Greece's Archaic period, in the 6th century BC, Dionysos was represented as a dignified, elderly bearded man. On one late 6th-century BC amphora (shown on page 39), he stands regally between a maenad and a satyr holding a *rython*, a type of drinking cup. In the following century, during the Classical period, Dionysos assumed the appearance of an ideal young man. Although not complete, a Roman copy of a marble sculpture from this period clearly portrays Dionysos as a beautiful, youthful man with long hair flowing over the front of his shoulders (shown on page 39). Later on, during the Hellenistic era, dating from the late 4th century BC onward, the god of wine had become a slender effeminate boy, (page 41, top). In this later era he is also portrayed

more frequently as a child.

The evolution of Dionysos's image perhaps reflects the social and political influences of the times, from Archaic severity and Classical idealism—when art tended to serve noble religious purposes such as the embellishment of temples—to the Hellenistic era, when art served a broader range of purposes, and tastes became more varied.

Dionysos's raucous entourage of satyrs, *sileni* (older satyrs), and *maenads* were favourite subjects for Greek artists. Satyrs were *bon vivants* par excellence. They are often shown drinking wine or chasing *maenads*. Their lustful pursuits are never depicted subtly. *Maenads* are usually shown dancing deliriously in a state of ecstasy or trying to escape the pursuit of satyrs.

In recorded history, Dionysiac festivals

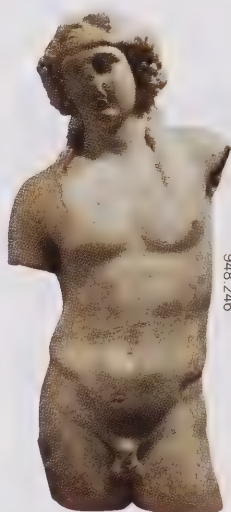


Background:
A party goer plays
the game of *kottabos*. The object
is to fling wine
sediment at a
target from a *kylix*.
Foreground, right:
kylix; middle:
the upper part of
a vase shaped like
a female head
shows a satyr
chasing a *maenad*;
left: this vase,
shaped like a
lobster claw,
shows a young
man singing.

Thebes, the Theban king, Pentheus, did not believe that Dionysos was a deity and refused to allow his cult to be practised. Despite this, Pentheus's mother, Agave, and the other women of Thebes, unable to resist the god's magnetic power, were running barefoot and crazed in the hills. Dionysos meanwhile had duped the king into donning female garb so that he could witness the spectacle. But Pentheus's fortunes soon turned. The band of women spied him hiding in a tree and, seizing him, they tore him limb from limb, as is so clearly shown on another *kylix* (shown large in the background, page 38). His pleas to his mother were to no avail, as, recounts Euripides, "she was foaming at the mouth, and her crazed eyes rolling with frenzy. She was mad, stark mad, possessed by Bacchus."

were much tamer than the frenzied orgies of mythological times. The annual celebration called the City Dionysia, for example, took place during March every year throughout the ancient period of Greek history. At the theatre of Dionysos, tragic, comic, and satirical plays were performed in honour of the god. Another traditional Athenian festival was the "Anthesteria," a three-day event held each year during the spring month Anthesterion, which celebrated the fruit of the vine. The first day of the festival, called the *Pithoigia*, or jar opening, honoured the inaugural opening of the new wine, which was stored in large *pithoi*. On the second day, called the feast of the *Choes* (wine cups), the chief feature was a procession through the streets, led by Dionysos riding in a ship on wheels. A citizen in Dionysian costume and mask would play the starring role. Although religious in nature, the festival was viewed as an opportunity for joyful and uninhibited celebrations. The third day, *Cythroi* (pots), was more sombre and marked by a drama contest.

Winemaking itself was a careful process. After the grapes were harvested and pressed, the grape juice was fermented in large clay pots, which were stored in special underground rooms. These sealed jars were buried to their shoulders to keep them at the required coolness. Once aged, the wine would be removed and transported in simple, undecorated amphora, a type of large jug. Many of these had handles that



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reported to prefer Chalybonian wine from Damascus, Syria. Egypt, which produced its own red and white wines, also imported product from Greece. The most celebrated vintages in Greece came from Macedonia, Thrace, the islands of the Eastern Mediterranean, and the area of Asia Minor opposite Peraea.

Ancient wine connoisseurs recognized and appreciated geographical differences. Their stringent standards for tasting are evident in this passage from Florentinus's *Geoponica*.

Wine experts prefer to taste when the wind is southerly, because that does not stir up the wine and demonstrates its qualities. One should not taste on an empty stomach, which dulls the taste; nor after a drinking session, nor after heavy eating. One should not taste after eating bitter or very salty food or food that will affect the taste, but after eating as little as possible of some digestible food.

The ancient Greeks never drank their wine neat; that was considered the act of a barbarian. They always mixed it with water. Proportions varied through time, but during the 6th century BC the preferred recipe called for one part wine to two parts water. The vintages of ancient Greece were probably very sweet, and dilution would make them more palatable. Adding water also rendered the wine less potent, allowing the drinker to imbibe over a longer period of time, which would have been convenient for all-night drinking parties.

While most wine drinkers today enjoy a glass with their meal, in ancient Athens wine was served after the main course, usually with dessert. It was also served during social

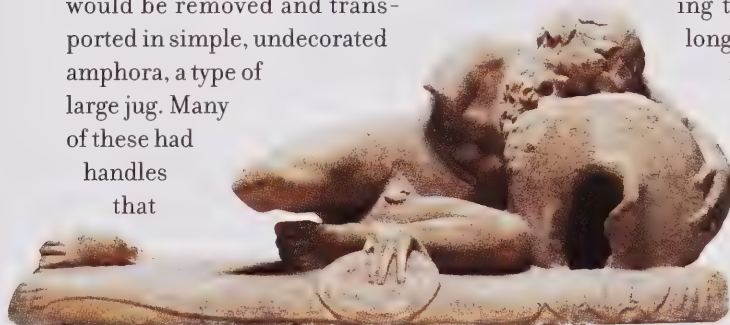
gatherings organized specifically to consume wine. The most famous of these Greek parties were the 'symposia.' These elaborate drinking feasts usually consisted of two parts: a meal first, wine after.

Participants would taste a mouthful of pure wine as a libation before it was poured into a large krater containing water. The

Top: The likeness of Dionysos, which appeared on almost all Greek media, changed over time. In the Hellenistic era (323 BC – 31 BC), when the original sculpture of this Roman copy would have been made, the god of wine was often shown as a slender effeminate boy.

Bottom: Recently acquired by the ROM, this sculpture of a sleeping silenos dates from the 1st century AD. The raucous followers of Dionysos were favourite subjects for both Greek and Roman artists.

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were stamped with seals, allowing scholars to determine the origin and sometimes even the date of "bottling" of the wine they once contained.

Archaeological evidence and written texts indicate that a vast wine trade criss-crossed the eastern Mediterranean world as early as the 6th century BC. The King of Persia was

In June 2001 the exhibition **Dionysos to Bacchus: Wine and Revelry** opens at the ROM. Presented by Global Financial Strategy Inc.

one shown below right is appropriately decorated with a scene of Dionysos, a flute-playing satyr, and a maenad. Wine was then drawn from the krater and poured into drinking cups with vessels called "oinochoe," which resemble modern jugs (shown below, middle).

Unlike the wine glasses used today, which are generally tall and slender, the an-

tellectual life. At Plato's *Symposium*, Socrates and his pupils engaged in discourses on the nature of love while enjoying food and drink. But not all symposia had an intellectual aspect. Sexual trysts, poetry readings, and uninhibited merry-making accompanied by music and singing were also encouraged—an early male bonding ritual.

Another kylix scene catches a symposium

in full swing. Men are shown dancing and drinking to the tunes of a harp and flute. The female flute player is being suggestively pawed by a refreshed party goer. Another image, painted on a vase shaped like a lobster claw, (page 40, left) which perhaps would have held a condiment for lobster dishes, depicts a young man reclining on a couch holding a wine cup and raising his right hand to his forehead in a gesture that signifies singing.

Drinking games were a popular part of symposia, with *kottabos* being perhaps the most common. One scene painted on a kylix shows a celebrant, shoes off, lying on a couch playing the game. Holding a kantharos in his left hand, he twirls a kylix in his right (shown page 40, background). The object of the game was to fling the thick sediment of wine resting on the bottom of the kylix at a designated target, usually a vessel located across the room.

But all parties must come to an end, even for a *senos*. In a sculpture recently acquired by the ROM, a devotee of Dionysos is portrayed as having passed out, rather ungracefully, on a panther skin, resting his heavy head on an overturned amphora (shown page 41, bottom). His drinking cup, a *phiale*, which he barely grasps with his right hand, and the empty amphora testify to his inebriated state. The once lively reveller is now sleeping off the effects of a drinking party.

The ancient Greeks are perhaps best known for contributing to our ideas of democracy, philosophy, and art. As profound and significant as those contributions may be, another Greek gift should also give us cause to raise a glass in its honour. The pleasure of wine. Ω



Background:
A youth carries
wine vessels.
Foreground, right:
A large column
krater was used to
mix wine with
water; middle: this
oinochoe used for
dipping wine from
the krater shows a
dancing satyr; left:
kylix with party
scene. All are red
figure wares
dating from the
5th century BC.

cient Greeks used something called a kylix, a low, broad-mouthed vessel with two handles, like the one above, left. Drinking wine from this cup would have been a multi-sensory experience. The vessel's broad shape with its wide pool of wine would excite the sense of smell when held close to the lips and allow wine to enter the entire mouth, stimulating the taste buds. The feel of a finely crafted vase held in one's hand would gratify the sense of touch while a superbly painted scene on the outside of the cup would please the eye.

As they socialized, guests would recline on couches that were placed against the walls, typically about seven to a dining room. Symposia played a large role in Athenian in-

THE CASE OF THE SALTY COFFIN

*Sleuth work by ROM conservators reveals
the cause of deterioration on an Egyptian mummy case*

THE WORDS "ancient Egypt" for most of us conjure up images of pyramids, golden funerary goods, and great riches. Unlike the richly decorated artifacts most frequently called to mind, the mummy case currently undergoing conservation work in the Museum lab of Marianne Webb is comparatively plain.

Dating from about 650 BC, from an area of Egypt known as the Dakhleh Oasis, the coffin is constructed of rough cedar planks held together with wooden pegs. It is decorated with simple painting on the face and chest. Because wood was a relatively scarce commodity in Egypt, the coffin's construction materials are not insignificant, although the rough-hewn wood and simple decoration indicate that the piece may have been made for a minor landowner.

There are three colours of paint: yellow ochre, red ochre (both earth pigments), and black. But marring the paint in many areas are mysterious white particles of a different substance. Before restoration work on the coffin can begin, Webb must determine the composition of the particles and what is causing them in order to decide how best to stop further outbreaks.

One of the first tests she undertakes



983.25.284



Top: Side view of the Egyptian coffin shows white particles that have appeared over the surface, destroying the paint as they form.

Bottom: One of the salts visible on the painted face was identified as magnesium sulphate hydrate.

DOUGLAS CONVERSE AND MARIANNE WEBB

is examining the coffin under ultraviolet light. UV light is helpful in determining the composition of materials and can also indicate previous repairs. In this

case, the particles fluoresced in several colours, indicating that a variety of materials are present, most likely different salts. Further tests are required to determine which ones. This information will indicate under what conditions the salt is soluble, allowing Webb to determine appropriate conservation for the artifact.

Malcolm Back of the ROM's Department of Earth Sciences is called in to analyze the compounds. He takes as many as 15 samples from various areas of the coffin's surface. Using the powder X-ray diffraction method, he identifies a magnesium sulfate hydrate (found in nature as the mineral hexahydrate) and at least two other compounds, as yet unidentified.

Often, when an Egyptian burial object has become damp, salts that occur naturally in the soil migrate into the artifact's construction materials. When the object dries, the salts crystallize. Webb points out, however, that salt could not have worked its way through cedar, and that therefore it must be part of the original construction of the coffin. She suspects that the salts are leaching out of the ground layer, a coating applied over the rough grain of the wood to provide a smooth surface for painting. (This process is very similar to that used by the European old masters, and most

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other oil painters, whereby a layer of gesso is brushed onto the wood or canvas before paint is applied.) The ground layer appears to be a very fine, light-coloured mud held together with an organic binder such as animal glue.

Mud and silt from Egypt is known to be very salty. This supports Webb's theory that salt is part of the object's original construction rather than the product of some ancient calamity. Malcolm Back's analysis confirms that the salts on the coffin's surface are also found in the ground layer. A ceramic or stone artifact could simply be submerged in a bath and washed until the salt is gone—indicated by the salinity of the water registering neutral. This method, of course, would not be suitable for treating the wooden coffin. Even the slightest amount of water would remove its ancient polychrome design.

For this artifact, Webb faces a very slow and painstaking restoration process. She is currently taking tiny samples from the ground layer where the salt crystals have not yet broken out. These samples will be tested at various humidity levels. Observing how the samples react, whether the salt crystals break out or not, will help the conservators determine the best storage and treatment for the object. More importantly, they will learn which environmental conditions must be avoided, since the salts remaining in the ground layer cannot be removed. Finding an appropriate adhesive to consolidate the powdery paint will also be a challenge. It must not change the appearance of the coffin or cause further salt outbreaks.

This will be slow work for the conservation team, but the time will be relatively short compared to the age of the object—which is more than 26 centuries old.

Marianne Webb is the Museum's decorative arts conservator and author of *Lacquer: Technology and Conservation*. Douglas Converse has a keen interest in Egyptology and worked with Marianne on her book.

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A CANNON IN MINIATURE

Tiny replicas served as toys, souvenirs, and tools of education

Dear ROM Answers,

THE ENCLOSED PHOTOS show a miniature bronze cannon cast in four pieces: the carriage, the two wheels, and the barrel, which is 20 cm (8 inches) long. On the barrel is the date MDLXX and an unclear coat of arms. The cannon appears to be a working model. It was acquired in England during the period 1939–1941. Other than that, little is known about the piece.

I would be interested in finding out more about it or where I might be able to research further information.

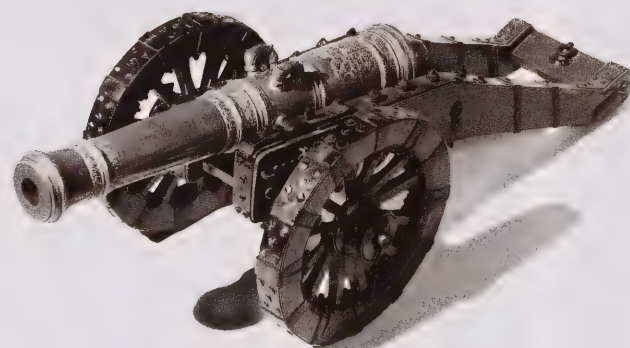
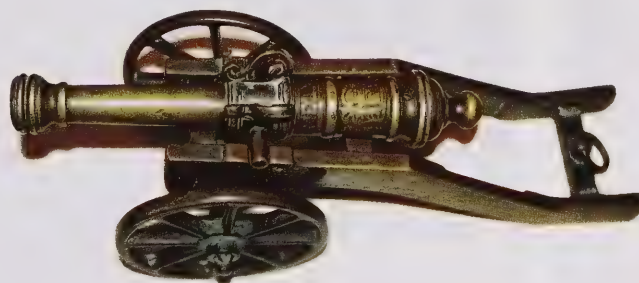
B. W., OAKVILLE,
ONTARIO

Dear Reader,

The brass cannon in your photographs, showing the date 1570 (MDLXX), is a free model or replica of a 16th-century Spanish field gun. The coat of arms at the breech, though worn, appears to be that of Castile. The cannon may be based on a known original, but it would take considerable time to discover the precise gun.

Significant numbers of miniature cannon—primarily of brass—were made in the 1800s as souvenirs and ornaments.

Your model is similar to these brass pieces and it is probable that, in a general way, it is related to them. Some were made in England and continental Europe, while others of distinctive pat-



Top and Middle: B.W.'s miniature replica, in bronze, of a 16th-century Spanish field gun was likely made as a souvenir in the late 1800s or early 1900s.

Bottom: This replica of a Spanish field gun made in the 19th century is from the ROM's collection.

tern were made in India. Miniature souvenir cannon similar to the one shown in your photos have been made in Spain over a fairly long period and

miniature cannon made entirely of brass turn up from time to time in the catalogues of antique dealers, particularly specialist arms and armour dealers. The models vary considerably in size and quality of casting and finishing. They are difficult to attribute to any specific locale and equally difficult to date. The 1570 on your cannon presumably refers to the date of a full-scale original and not to the miniature itself.

The wheels on your model are similar to those of toy cannon of the late 1800s to early 1900s made in both Europe and North America. Your model could therefore date anywhere from the middle to the second half of the 19th century or even to the early 1900s.

You may be interested for purposes of comparison in the ROM's two replicas of similar cannon. The ROM miniatures are 101 cm (39 inches) in length, and have wooden carriages and wheels with metal mounts. Reasonably accurate replicas of 17th-century field guns, they are believed to be of Spanish origin made for the English market and are considered to date

K. COREY KEEBLE

have appeared in gift shops down to the present day.

Examples of 19th-century Spanish

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COMING IN THE WINTER 2000 ISSUE

The First Image of Buddha

Before the Gandhara school
of art took the radical step,
Buddhists intentionally
chose not to represent
Buddha in any artistic
medium. David Jongeward
travels to Pakistan to find
the roots of Buddhist art.

ROTUNDA





from the 19th century.

Similar miniature cannon were also made in the 1600s for the education of princes who were introduced to the arts of war at an early age. While these may have been played with as toys, the pieces also served in serious matters of education. In other cases, miniatures were used for instructional purposes among the military, and may have served to record patterns or designs for ordnance. Undoubtedly many of these could be fired.

Some miniatures were intended as signal cannon—simply to make noise that could be heard at a distance—and

others were designed more as mementoes and as nostalgic reminders of an earlier period in history. They are significant as examples of our eternal fascination with the art of the miniature, and of the skills—akin to those of the jeweller and watchmaker—required to replicate objects on a reduced scale. The appeal of the world of Lilliput is as captivating as it is eternal.

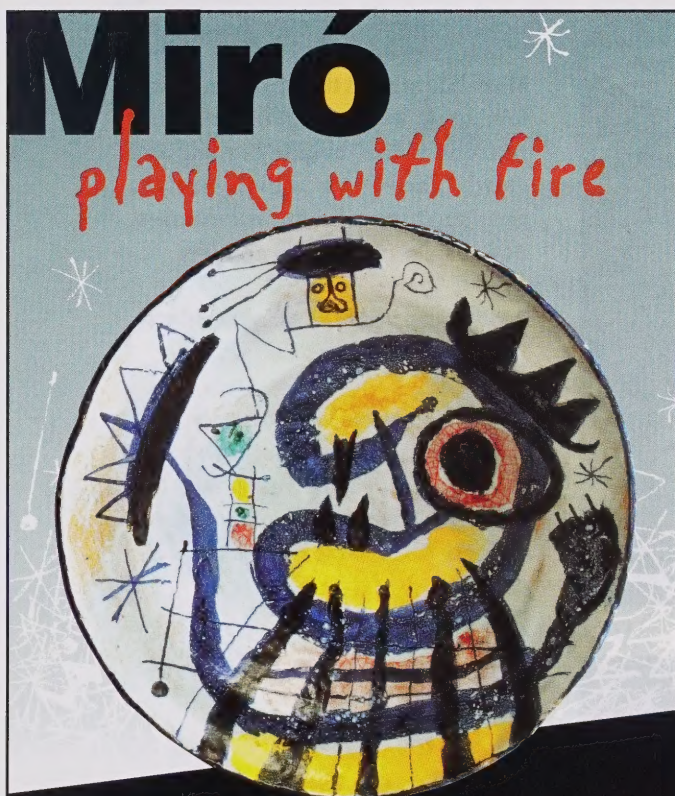
K. Corey Keeble is curator of decorative arts in the Department of Western Art and Culture at the ROM and a recognized authority on European arms and armour.

WE'D LIKE TO HEAR FROM YOU

If you own furniture, silver, glass, metalwork, ceramics, textiles, or small decorative objects that may have an interesting past and have aroused your curiosity, this column is for you. Send a clear colour photograph (or 35-mm colour slide) of the object against a simple background, providing dimensions, a description, any markings, or any known details of its history to: ROM Answers, c/o *Rotunda* Magazine, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6. Be sure to enclose a stamped, self-addressed envelope large enough to include any photos that must be returned to you.

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Letters will be acknowledged as staff time permits.



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The Queen Mother Visits the ROM in 1965

ROM ARCHIVES

ON THE OCCASION of her visit to the Museum on June 26, 1965, Her Majesty the Queen Mother Elizabeth is presented with a copy of the coffee table book *Art Treasures in the ROM*. Lionel Massey, associate director, administration, is the proud presenter. Before this snap was taken, the Queen Mum had signed the Museum's visitors' book, which is open on the desk in front of her, beside her bag and gloves. The volume, which contains the signatures of many dignitaries, now resides in the ROM archives.

Adapted from the ROM's Link newsletter.

If you remember an occasion at the ROM or an exhibition that has stayed with you across the years, send us your reminiscences at info@rom.on.ca.

JULIA MATTHEWS



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